A Monograph on Silk Fabrics

A MONOGRAPH

ON

SILK FABRICS

PRODUCED IN THE

NORTH-WESTERN PROVINCES AND OUDH.

Compiled by A. YUSUF ALI, Esq., I.C.S.

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FOREWORD

India's rich heritage of handmade textiles is well-known. However books dealing about the technique, the craftsmen, the trade and the historical background involved in each of such textiles are either not written or are out of print since long. The Calico Museum of Textiles has undertaken research programmes for publishing accounts of Historical Textiles of India in one series and study of Contemporary Textile Crafts of India in another series. In this context it has been felt necessary to reprint rare but well documented books on any of the rich textiles and supplement it with the study of its contemporary position. The first venture in this direction is the reprint of the monograph on "Silk Fabrics produced in the North-Western Provinces and Oudh" compiled by A. Yusuf Ali, Esq., I.C.S., first published in the year 1900 at the N. W. Province and Oudh Government Press, Allahabad, now in Uttar Pradesh.

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PREFACE.

I WOULD beg leave to acknowledge the assistance I received from the officers who wrote the district reports. It was through Mr. M. Keane, I.C.S., of Benares, that the photographs appended to the Monograph were taken on the spot at Benares, and he has also enabled me to study the Benares designs by means of the specimens he forwarded. Other officers whom I would desire to mention particularly are Mr. A. C. Chatterji, I.C.S. (Allahabad), Saiyid Zain-ud-din (Farukhabad), Bábu Bhajan Lal (Partábgarh), Mr. J. F. Fanthome (Agrá), Munshi Kundan Lal (Mirzapur), and Bábu Rama Smaran Lal (Azamgarh). Among non-official gentlemen, I received most assistance from Saiyid Mujtaba (Agra), Mr. Pink, Manager of the Lister Estate (Dehra Dún), and P. Srinavas Panday of Ahraura (Mirzapur)

ABDULLAH *IBN* YUSUF ALI, I.C.S.

The 25th July 1899.

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A

MONOGRAPH ON SILK FABRICS

PRODUCED IN THE

NORTH-WESTERN PROVINCES AND OUDH.

CHAPTER I.

The Silkworm.

A BRIEF account of the silkworm and the various tribes of it that are found in the North-Western Provinces and Oudh may not be out of place in a monograph on silk fabrics. The literature of the Indian silkworm and of sericulture is fairly voluminous; the articles on this subject in Dr. Watt's Dictionary of the Economic Products of India cover as many as 238 pages of small type. For our purpose it will be sufficient in this chapter to indicate the different species of the silkworm which figure in the history of the sericulture of these provinces, and to append a brief general note about their life-history. The chapter on sericulture will show in detail what has been done in the past and what is being done now in the rearing of these insects.

2. Silkworms are usually divided into the domesticated or mulberry-feeding and the wild or non-mulberry-feeding worms. This division, though it has no pretensions to scientific accuracy, has the sanction of usage; though it must be noted that some of the mulberry-feeding insects are wild, *e.g.* the Theophila Huttoni, and some of the so-called wild insects have been more or less domesticated for ages. The mulberry-feeding insects have been collectively classed as Bombycidæ, and those which do not feed on the mulberry as the Saturniidæ.

(i.) Domesticated.
(ii.) Wild.

(i.) Bombycidæ.
(ii.) Saturniidæ.

3. Among the Bombycidæ some species are Univoltine, *i.e.* producing only one crop of silk during the year. Of this kind is the ordinary European silkworm *(Bombyx Mori)*. Others pass through a succession of generations during the year, sometimes amounting to as many as eight, and are called Multivoltines. Of this kind is the Bengal silkworm, of which there are several varieties. Intermediate between these two kinds are Bivoltine, Trevoltine, and Quadrivoltine species which produce two, three, and four generations respectively in the year. These, however, are comparatively unimportant, and in several of their characteristics approximate the Univoltine species. Every generation or cycle of the Multivoltine is not utilized for a silk crop. There are generally three or four well-defined crops used for silk, while the rest are used for raising seed-cocoons. Each definite cycle is called a *band;* thus we speak of the Bhádon (September) *band*, the Kártik (November) *band*, &c.

(i.) Univoltines.

(ii.) Multivoltines.

Their characteristics.

4. The cocoons of the Univoltine silkworms are of a firm and close consistency, so that the silk can be readily reeled off them, and the eggs require a certain degree of cold to hatch out regularly and healthily. The eggs of the Multivoltines, on the other hand, hatch out healthily without exposure to cold, and their cocoons contain comparatively little silk, and that little is wound so loosely as to be difficult to reel off without entanglement. It will at once be perceived that the Univoltines require a temperate climate,—a "cold" climate, as it would be termed in India. A temperature of much over 70 degrees is injurious to them. The Multivoltines, on the other hand, are suited to the climate of the plains, provided there is sufficient moisture to prevent hot blasts of air affecting them, and to enable the mulberry to yield several crops of leaves in the year. These conditions are fulfilled in the case of Bengal, and therefore the Multivoltine mulberry worm thrives in that province, while the Univoltine is established in Kashmir. With regard to these provinces the Bombycidæ are for industrial purposes exotics altogether, though some of them are found in a wild state in the Himálayas.

Six classes of Bombycidæ.

5. Of the Bombycidæ six species deserve our attention, *viz.* the Bombyx Crœsi, the Bombyx Fortunatus, the Bombyx Mori, the Bombyx Textor, the Bombyx Sinensis, and the Theophila Huttoni.

(i.) Bombyx Crœsi.

6. The Bombyx Crœsi is the same as the Nistri or Madrási worm. It has a milky-white moth and its cocoons are fairly large. It is Multivoltine. It was tried by Captain Hutton in Mussoorie and throve well. It is one of the worms now being tried by the Honourable Rája Rámpál Singh on his estate in the Partábgarh district. The Bombyx Sinensis, to be mentioned below, has sometimes been confounded with it, and it has been suggested that the latter may be a mere degeneration of the Madrási worm.

(ii.) Bombyx Fortunatus.

7. The *Bombyx Fortunatus* is what is known as the *Desi* or country worm, and is sometimes called *the* Bengal silkworm. This worm is Multivoltine. It has been tried in several places in these provinces and is at the present day being tried in the Partábgarh district and on the Lister Grant* in Dehra Dún. It prefers the shrub mulberry to the tree mulberry which alone is available in the Dún, and is distinctly out of favour on the Lister Estate.

(iii.) Bombyx Mori.

8. The *Bombyx Mori* strictly so called is the Chinese domesticated silkworm now mostly reared in Europe, China and Japan, Central and Western Asia, as well as America and Australia. It is a question whether the other mulberry-feeding insects are not mere varieties or sub-species of the Bombyx Mori. It is the largest and strongest of the domesticated species and is Univoltine. The silk it produces is golden yellow or white in colour, and it is practically the one on which attention is concentrated on the Lister Estate. The Kashmir silkworm is of this kind; its fibre produced in Kashmir compares favourably with the best fibre produced in other parts of the world. For the Lister Estate the eggs are hatched in Dehra and the cocoons are ready by the end of March. In the hot weather the seed is carried to Mussoorie or Landaur, an elevation of more than 7,000 feet above the sea level.

(iv.) Bombyx Textor.

9. The *Bombyx Textor*, or *Boro polo* or large *Pat*, is a Univoltine insect of a paler colour than the *Bombyx Mori*; it is hence sometimes called the white silkworm. *Pat* silk (white) is one of the three kinds of "wild" silk well-known and commonly utilized in Assam, the other two being Eri and Muga. The Bombyx Textor was tried both in the Mussoorie experiments and in Dr. Bonavia's experiments in Oudh.

* See, as to the Lister Grant, section 53, Chapter II.

10. The Bombyx Sinensis, vernacular name *Chiniá* or *Siná* or small *Pat;* a Multivoltine cultivated by Captain Hutton at Mussoorie for experimental purposes. It is easily distinguished from other species by the fact that it hatches a whole batch at once and at any time during day or night and is most prolific, while the other species only hatch slowly in the morning hours up to noon. (See also section 6.)

(v.) Bombyx Sinensis.

11. A wild mulberry-feeding silkworm, the Theophila Huttoni, must not be passed over in a monograph for these provinces. Captain Hutton discovered it in Simla in 1837, and again in Mussoorie in 1842. It occurs abundantly in the hill forests of these provinces. Captain Hutton, under the orders of the Government of India, performed a series of experiments in sericulture with it in 1858; but the worm was found impossible to domesticate. A cross between it and the *Bombyx Mori* was also a failure. It is a Bivoltine. Mr. Pink, the Manager of Lister Estate ir Dehra, experimented with a few worms of this species last year at the instance of Dr. Watt, but he too found them quite intractable. To quote his own words:—"They all committed suicide in the plate of water which surrounded their tray."

(vi.) Theophila Huttoni.

12. The mulberry-feeding silkworms are subject to several diseases, of which four are important and may be mentioned here:— (1) *Pebrine,* known in Bengal as *Kata,* characterized by the presence of miscroscopic corpuscles of oval shape which are found in the tissues of the silkworm *pupa,* moth and eggs. The disease is both contagious and hereditary. (2) *Flacherie,* known in Bengal as *Kala shira,* characterized by the presence of a chain-ferment in the digestive organs of the silkworm and *pupa.* (3) *Muscardine,* known in Bengal as *Chúna,* characterized by a white efflorescence on the body of the worm which appears some hours after it has died of the disease. It is caused by a fungus, and though contagious, is not hereditary, but the worm affected by it transmits a predisposition to the disease. (4) *Grasserie,* known in Bengal as *Kasa.* This is not hereditary, and the Manager of the Lister Estate supposes it to be a mere form of general debility caused by heat. Mr. N. G. Mukerjee says that the last three diseases have always been known in Bengal; but Pebrine has only appeared there within the last ten years. They have all in recent times been noticed in the experiments in these provinces. The researches of M. Pasteur have shown that microscopic selection of the breeding stock is the best preventive, and this method is the one now generally adopted.

Diseases.

13. These silkworms are also liable to suffer from the ravages of various pests, of which the most important is the Bengal silkworm fly (Trycolyga Bombycis). It attacks both the mulberry worm (Bombyx) and the Eri worm (Attacus Ricini), to be mentioned hereafter.

Pests.

14. We now come to the class Saturniidæ. Of these there are several species found in the wild state, especially in the mountains, which have not been commercially utilized. Among these may be mentioned (1) the *Actias Selene* or the swallowtail silkworm found abundantly in Mussoorie, but the silk is scanty and not windable, though experiments have been performed with it. The cocoons are rather large. It feeds on the wild cherry, the walnut, and other mountain trees or shrubs. (2) *Antheræa Pernyi,* semi-domesticated in China. Its product is called the Chinese Tasar, which forms a large proportion of the so-called "Tasar" supply of Europe. The Indian Tasar moth is different and will be described below. This insect's life-history was investigated by a Frenchman, the Abbé Perny, about 1850, from whom its takes its name. It feeds on the mountain oak and is being

Saturniidæ.
(i.) Those not commercially utilized.
(a) Actias Selene.
(b) Antheræa Pernyi.

experimented with by the Forest Department at Chakráta. (See section 66, Chapter II.) (3) *Antheræa Roylei.* It was domesticated by Hutton and is like the Indian Tasar moth, though smaller. It feeds on the leaves of the mountain oak and is found all along the Himálayas. Probably it will be found more suitable for Himálayan rearing than the Antheræa Pernyi whose oak is found on higher altitudes than that of the Antheræa Roylei. (4) The *Antheræa Yamamai* is a Japanese insect, which may be reared on the Himálayan spiny oak (Quercus Incana). It was the subject of several experiments at Mussoorie, and at one time it was thought that it yielded a valuable hybrid with the Indian Tasar insect, but nothing has been heard of it in recent years. (5) The *Attacus Atlas*, an omnivorous worm which is found in Mussoorie and Almora, is easily reared and is abundant in some of the Sub-Himálayan tracts.

(c) Antheræa Roylei.

(d) Antheræa Yamamai.

(e) Attacus Atlas.

15. So much for the Saturniidæ which have been experimented with, but not utilized in these provinces. The only two Saturniidæ utilized commercially in these Provinces are the Tasar and the Eri, and these we must proceed to describe in some detail.

(ii.) Those commercially utilized.
(a) Tasar.
(b) Eri.

16. The Tasar silkworm is the most abundant, the most important, and commercially the most valuable of the Indian wild silkworms. Its entomological names are various, just as it is called by different vernacular names in different parts of the country. Dr. Watt in his Dictionary of the Economic Products of India, article—Silk, Tasar—gives eleven scientific synonyms, besides the standard name *Antheræa Paphia*, which he adopts. The following may be noted here, as they occur in the official literature of the subject connected with these provinces—(1) *Antheræa Mylitta*, (2) *Phalæna Mylitta*, (3) *Attacus Mylitta*, and (4) *Phalæna Paphia*.

Tasar: different scientific names

17. The vernacular names by which this insect is known are various. Bengal alone has half a dozen names for it, of which *Tasar*, *Bughy*, and *Guti* may be mentioned in passing. In these provinces it is utilized only in the Mirzapur district and is there called *Koa*, which literally means a cocoon. In the Oudh districts, during the period when inquiries about sericulture were carried on with activity under the enthusiastic guidance of Dr. Bonavia (see section 36 *seq.*, Chapter II), an insect called *Kuswári* or *Kuswáru* was brought to notice, which was identified with the Tasar insect (Phalæna Paphia)

and vernacular names.

18. There are, however, great differences between the Kuswári and the Tasar insects. The former generally lives on *ber* trees (*Zizyphus jujuba*), although it is sometimes found on other trees; while the Tasar insect of Mirzapur mostly lives on *asan* trees (*Terminalia tomentosa*) and the *kakor* tree (*Zizyphus xylopyra*), though it has been reared on bushes of sáoni (Lagerstrœmia Indica).* The former the Bengalis call *Bughy*; the latter *Jarvo*. The former yields small pale cocoons which are found scattered over wide areas of country, the latter yields cocoons which are twice that size, darker in colour (though they vary), and more oval in shape, *i.e.* not quite so long in proportion to their width; they may also be collected in great quantities within a limited area. Whether these insects belong to the same species or are mere local varieties, and whether *Kuswári* itself is not a name applied in different places to different insects is much open to doubt. Entomologists generally consider the Mirzapur insect and the Kuswári to be one and the same species (Antheræa Paphia), subject to a vast diversity in regard to appearance and

Differences between Tasar and Kuswári insects.

* This is the favourite shrub of our gardens showing bunches of pink or white flowers with six delicate curly petals.

food in accordance with the variety of local conditions: although this opinion has not always prevailed in the past, and may possibly be discarded in the future.

What is Tasar?

19. The word "Tasar" itself is one of the most unsatisfactory ever used in commercial terminology. It is supposed to be derived from a Hindi word tasar, meaning a shuttle, from the Sanskrit trasara. But how the word trasara (shuttle) came to be associated with silk, and this particular kind of silk only, is a puzzle which must be left to the curious philologist to solve.* It may be found after all that the accepted derivation from trasara, a shuttle, is altogether fallacious, and that the word is aboriginal, the principal tribes engaged in the collection of Koa cocoons in Mirzapur being Kols and other non-Aryan sections of population.

Vernacular usage.

20. The ordinary use of the word Tasar in the vernacular appears to be to denote the fabric, not the cocoon or the worm. Again it is not necessarily the fabric made from the fibre of the Antheræa Paphia that is so denoted. In Mirzapur and Azamgarh a mixed cotton and silk fabric bears that name, while in other districts the bázár use at any rate of the word is to denote any inferior or coarse kind of silk fabric. Some *bazzázes* (drapers), a ain, restrict the word to what is otherwise called Kosa (connected with Kuswári?) or Bhágalpuri, which may or may not be co-extensive with the use of the word in European languages for any dark coloured stuff produced by a wild silk moth, including the product of the Chinese *Antheræa Pernyi*.

Standard spelling.

21. The confusion is "worse confounded" by the innumerable forms in which the word is spelt in European languages. In French it is written Tussore or Tussah, while other modes of writing it in the European languages are Tussar, Tasur, Tasser, Tesser, Tasseh, Tusha, &c. According, however, to the Hunterian principles of orthography officially adopted for Indian words, it will be best to spell this word *Tasar* uniformly.

Habitat of Tasar moth.

22. The *habitat* of the Tasar moth has also been much disputed. In the map (Plate XXIV) attached by Mr. Wardle to his Hand-Book of the South Kensington Museum collection of the wild silks of India, the whole of India (excluding Rájputána), and therefore the whole of these provinces, is shown as the tract where it is found. This book was published in 1881. Dr. Watt's Dictionary (1893) considers this a mistake and says: "It seems, practically speaking, to be absent from Panjáb, Rájputána, the North-Western Provinces, and Oudh. It nowhere occurs upon the Himálayas proper and never ascends above 4,000 feet in altitude and is rarely if ever found on the alluvial plains except where these are limited and confined by hilly undulations." The present writer is able to affirm from personal observation that the Kuswári is found on *ber* trees in the Hamírpur and Bánda districts; but this may possibly come under the exception in the sentence quoted above as to "hilly undulations." The fact, however, of the Kuswári insect being similarly found in the districts of Rae Bareli and Unao (which have no hilly undulations) is vouched for by the writers of the monographs for those districts, and on the whole it would appear as if the Kuswári insect is really known over a wide area, if not over the whole of the North-Western Provinces and Oudh. If Dr. Watt's Dictionary is correct, the Tasar worm must be different from the Kuswári worm.

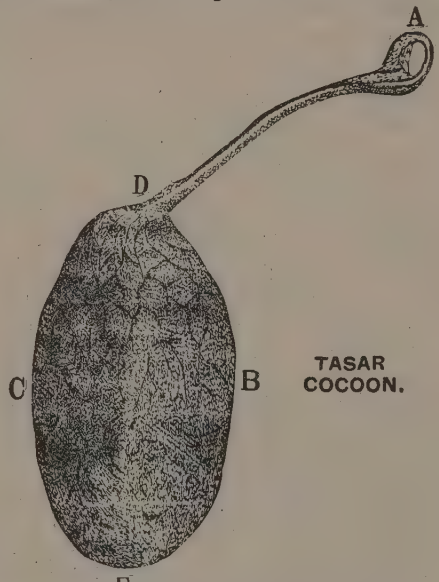
* It may be noted that the T in the Hindi word तसर for shuttle is the soft dental T त ت while as pronounced by the people the word for wild silk is always टसर with the sharp palatal T (although the English Dictionaries confuse the two forms) and that there are few words in which the two T's ट ٹ and त ت are interchangeable; so that the accepted derivation from तसर (shuttle) must be received with considerable reserve until satisfactory evidence is produced in its favour.

ILLUSTRATION No. 1 (SECTION 23).

FEMALE TASAR MOTH.

Mirzapur Tasar.

23. The Tasar is in reality a wild moth, but a process of selection and supervision has probably to a certain extent affected the breed in Mirzapur district, and improved it from a silk-producing point of view. Certain it is that the cocoon of the semi-domesticated Mirzapur worm is on the average about $2\frac{1}{8}$ inches long and about $4\frac{1}{8}$ inches round the circumference at its middle or thickest part, and contains more fibre than would be found in its purely natural state. The result is arrived at by a selection of the largest cocoons to breed from, for purposes of commerce.



TASAR COCOON.

ILLUSTRATION No. 2 (SECTION 23).

Kuswári.

24. The Kuswári insect being a totally different variety (if not altogether a different species) will now claim our attention. Mr. Carnegy, Deputy Commissioner of Fyzabad, was the first to call attention to this insect in 1862-63. He calls it the *Phalœna Paphia*, otherwise the *Bombyx Mylitta*. It was not then utilized much for commercial purposes except that its fibre was (he says in his report) used as a band for tying the barrels on to the stocks of matchlocks. As a matter of fact it was strips of the cocoon shell that were so used and are so used now (see section 25), though the complete disarmament of the country has limited the demand for it. Inquiries made from District Officers shows that the product of the Kuswári insect is not utilized to any very great extent in Oudh, although the insect itself is commonly found flourishing on *ber (Zizyphus jujuba)* and *sál* trees *(Shorea robusta)*, and the grasses known as *munj (Saccharum moonja)* and *kus (Poa cynosuroides)*.

From the *kus* it is said to derive its vernacular name Kuswári, Kusyári or Kusári.*

25. The Kuswári insect is not, however, confined at the present day to Oudh; it is found in Bundelkhand and other plains districts of these provinces, mostly on *ber* trees. In Bánda district, and indeed in most of the districts of the provinces, thin strips of its cocoon shell about one-fifth of an inch wide are used in tying round *láthis* (bamboo clubs), *gulels* (rustic bows), walking sticks (*chharis*), and *gatkas* (single-sticks),† for the double purpose of strengthening the stick and serving as an ornament. The whole of the cocoon shell is cut in a continuous spiral, of uniform width, so as to produce one long strip. In appearance it is tough and smooth and adheres closely to the stick, and might easily be mistaken for leather. The fibre is not utilized in these provinces, although there is no reason why an experiment should not be made with it for weaving silk fabrics. The fibre is not unlike that produced by the Tasar silkworm of Mirzapur.

Eri, the castor-oil-feeding worm.

26. The Eri silkworm (Attacus Ricini), is the only silkworm connected with the history of the sericulture of these provinces that we have not described. Both its vernacular and its scientific names refer to its food, the leaves of the Palma Christi or castor-oil plant (Ricinus Communis), Eri being a Purbi (and Assamese) form of the word *Andi* used in the greater part of these provinces. It is very largely used in Assam, in connection with which it is mentioned in the official records of the East India Company as early as two centuries ago. The cocoon of this species is very soft and in colour white or yellowish. The filaments are so arranged that it is difficult to reel the silk, and it is usually spun like cotton—a device which Mr. Wardle warmly recommends. It is a Multivoltine, and is easily reared. But it is specially subject to the attacks of the ichneumon fly. With the discovery of improved methods of carding and spinning inferior silks instead of reeling them, a new demand for this silk has arisen in Europe which has materially raised its price in India. For purposes of dyeing it bears the same character as ordinary Indian Tasar. This insect is being tried on the Honorable Rája Rámpál Singh's Estate in Partábgarh district.

Hybrids.

27. We have now reviewed the different kinds of silkworms of which any account need be taken in a Provincial Monograph like the present. As will appear in considering the history of Provincial sericulture, experiments have been performed in these provinces with all these kind of silkworms at different times, and cross breeds have also been attempted, but the latter have generally shown a tendency to revert to the worse of the two types represented by the parent stocks.

Life-history of silkworms.

(1) Egg.

28. Like all insects, every kind of silkworm goes through four stages in its life, in each of which it leads an entirely different species of existence. The first stage is represented by a minute egg laid by the mother moth. These eggs in the case of the mulberry-feeding silkworms are collected on paper to which they naturally adhere. Commercially, these eggs are transmitted from place to place on cards which generally contain about 23 to 24 drachms of *graine*, as the eggs are called.

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* Kus or Kush is the Hindi sacrificial grass, used in the offerings to the *manes* of deceased ancestors. Saiyid Raza Husain, Deputy Collector of Rae Bareli, is the only officer who mentions that the Kuswári is found on munj and kus grasses, and he is responsible for the derivation of the word from *kus*. This, however, is open to doubt. If the Gujrati word *kasárí* for cricket (the insect) is derived from the same root, there may be a root word in Prakrit denoting "an insect" generally, or something of that kind. The term "kuswári" is usually applied to the cocoon, but the ordinary rustic does not know that it has anything to do with an insect, much less that it is the cradle of a beautiful moth.

† The play of Phari-gatka is one of the most popular sports practised by the Akháras in the Moharram festival. The *Phari* is the shield used for parrying the adversary's thrust; the *gatka* is the stick which forms the weapon of attack.

29. From the egg state comes out the caterpillar or larva or worm. This is its second stage, during which it lives for quite a number of days, usually about 15 to 25 or 30. The figure varies for the different species and for each species according to variations of weather and climate. In this stage it consumes a vast quantity of food out of all proportion to its size. Each species has its characteristic food-plant: for example the mulberry, the oak, or the castor-oil plant. In fact this question of the supply of the food-plant entirely governs the prospects of sericulture with a particular silk-worm in a given locality. It has been calculated that the larvæ which hatch out from one ounce of seed and occupy about 9½ square feet of space in the beginning, have, by the time they have reached maturity, grown sufficiently big to occupy 240 square feet of space and consume about 1,500lbs. in weight of leaves during the period of 15 to 25 or 30 days. In this stage also they undergo four moults.

(2) Larva.

30. After all this "good living," the worm finally builds for itself a little house in which to rest before converting itself into a moth. This third stage (pupa or chrysalis) is the one in which the silkworm secretes the silk fibres, which it winds round itself to form a cocoon for protection and rest. When the silk is intended to be utilized the development of the worm is arrested in the chrysalis. The cocoon is boiled or steamed and the insect within smothered and killed. If the insect were allowed to emerge as a moth by forcing its way through the cocoon the continuous fibres of silk would be broken or disarranged in innumerable places, and the silk would be spoiled. Those cocoons which are intended to be used for perpetuating the species are set apart: no silk is taken out of them and the insects within are not killed, but allowed to consummate their life cycle by coming out as moths.

(3) Chrysalis.

31. In due time when conditions of temperature and moisture are favourable these cocoons burst open* and allow of the exit of an active little moth, with four bright wings covered with mealy matter from which all butterflies and moths as a class derive their scientific name of Lepidoptera, "scaly-winged." This mealy matter is found on microscopic examination to be little scales attached to the wings at their pointed end. In the winged state ("the Imago") the moths breed, lay their eggs, and die. This stage in the silk-moths generally lasts about 24 hours for the males, and two or three days for the females, who lay 200 or 300 eggs before they die. This completes their life-history.

(4) Imago.

32. A word might be added regarding the "silk spider" whose web was collected in Bhim Tál by Mr. Duthie, Superintendent of the Botanical Gardens, Saháranpur, in October 1885. It is well known that some kinds of spider weave a strong elastic web whose fibres are like silk. The North American *Nephila plumipes* is a well-known example; but the silk spider also occurs in West Africa, China, and Australia. It was an account of the Australian silk spider that called Mr. Duthie's attention to the Bhim Tál variety. A specimen of its web was sent through the Government of India to Mr. Thomas Wardle, the eminent authority on Indian wild silk; and at first it was hailed as a new commercial fibre of the future. It could not, however, be collected in sufficiently large quantities, and the report of Messrs. J. & T. Brocklehurst and Sons, of Macclesfield, on the result of their endeavours with it (1886), was discouraging. They wrote:—

The silk spider.

"We return the spider waste boiled off as well as we can. We can do nothing with it. The staple is too short and unsound, besides the amount of staple in the bulk is so small, as compared with the foreign matter, it renders it quite impossible for us to deal with it."

The insect was identified by the Reverend O. P. Cambridge as the *Nephilengys Malabarensis* according to the nomenclature of L. Koch, though previously it had been known as the "Nephila Rivulata."

The chemical tests for silk will be found in Appendix I.

* The Eri cocoon, however, is open from the time it is spun.

CHAPTER II.

Sericulture, Past and Present.

33. The first attempt in these provinces at a systematic inquiry into the possibility of sericulture on a large scale was made by Captain Hutton of Mussoorie. In February 1856 he submitted to the Government of the North-Western Provinces certain proposals of which he defined the object as follows:—

First experiments by Captain Hutton.

"The object should be in the first instance to ascertain what number of species our forests afford; the quality and quantity of silk procurable from each; the practicability of transferring them to Europe; and whether they will submit to domestication like the *Bombyx mori* or whether they require to be left to nature in suitable localities where they can be watched."

34. The Government of India accorded sanction to an experiment in sericulture to be carried out under Captain Hutton's supervision; but in November 1859 Captain Hutton reported that the experiment did not promise success; first, because the Bombyx Huttoni, which was experimented with, did not care for the quick-growing China mulberry, while the wild mulberry, when propagated by cuttings, took too long to grow; and secondly, that the worms of this species were too intractable to submit to domestication. At the same time Captain Hutton contended that Mussoorie was an excellent place for further experiments with other silk-producing moths, and advocated further attempts, which however were disallowed by Government. Captain Hutton, however, submitted a memorandum in 1863 with reference to the disease then prevalent among worms of the species Bombyx mori in France and Italy. His theory was that the disease was only a result of degeneration due to a long course of domestication; that the wild Bombyces were more strongly coloured than the pale domesticated worm; and that in a thoroughly vigorous state the Bombyx mori would be black. He adopted a method of careful selection, picking out all the dark coloured worms and breeding them *inter se*, and the white worms *inter se* separately. In two or three generations he got worms much darker than before, and larger and more vigorous than the pale ones, with larger and better stuffed cocoons. He did not, however, obtain any further assistance from Government, who considered the theory at that stage to be too speculative to warrant a grant from public funds towards its development.

With the Bombyx Huttoni.

Failure.

Hutton's theory.

35. In those days the deadly disease Pebrine had made its terrors felt in sericultural establishments all over the world, and the most expert scientists of Europe were engaged in the task of devising some means wherewith its ravages could be stayed. M. Pasteur had not then discovered that the disease could be avoided by a careful selection of the eggs with the microscope, and Captain Hutton's experiments with moths possibly from deceased eggs really proved nothing (Mukerjee's Diary, page 8). He became discouraged: and wrote, "With the Bombyx, I will have no more to do."

Proved nothing.

36. Meanwhile, however, Dr. E. Bonavia had been attempting to establish the silk industry in Oudh on a popular basis with the domesticated mulberry worm. He believed that the climate and soil of Oudh were suitable for the rearing of the worm and the growth of the mulberry which forms its food, and he performed a series of experiments, both

Sericulture in Oudh.

himself and through District Officers, which are described in his book called "Sericulture in Oudh." That book details the measures taken up to the year 1863, when Dr. Bonavia wrote.

Captain Hollings.

37. About the beginning of 1847, Captain Hollings, who had charge of the Chár Bágh in Lucknow, had introduced the large-leaved China mulberry plant into the garden by forming a small plantation; he also reared silkworms, but when he left there was no one to carry on his work in that direction.

Dr. Bonavia.

38. In 1861 the Agri-Horticultural Society of Oudh was started, and Dr. Bonavia took up the work of experiment with different kinds of mulberry trees. He found some of Captain Hollings' trees still in existence in the Chár Bágh in Lucknow, but he propagated a great many more, and freely distributed cuttings to District Officers and others for experiments in different districts of Oudh. Two kinds of China mulberries were obtained from the Saháranpur Botanical Gardens and over 8,600 cuttings had been distributed in 1863. Good results were obtained in Fyzabad, Bahraich, Lakhimpur (Kheri), Sultánpur, and Rae Bareli. Dr. Bonavia arrived at the conclusion that all kinds of mulberry trees thrived wonderfully well on the soil of Oudh. He sent samples of his silk to the great pioneer of modern international exhibitions, the London Exhibition of 1862, and the verdict of the Judges was as follows: "The silk there produced is not only greater in quantity but infinitely finer in quality than any raised in Bengal; in fact it is in every respect equal to the best China silk."

Hardoi.

39. Mr. A. Lindsay, Deputy Commissioner of Hardoi, performed an experiment with Kashmir silkworms in the cold weather of 1862 to 1863. The silk produced was good, but the worm deteriorated in the succeeding generations.

Fyzabad.

40. In Fyzabad district, Mr. P. Carnegy, Deputy Commissioner, was in charge of the experiment in 1862-63. His results with the mulberry silkworm were similar to those noted above for Hardoi, but in his report he called attention to the wild Tasar insect of Oudh which he calls the Phalæna Paphia, otherwise the Bombyx Mylitta, called in the vernacular *Kuswári.*

Sítapur.

41. In Sítapur, about the same time, plantations of mulberry were formed and the different silkworm tried under Government direction. Mr. P. L. Carnegy, a grantee of land in Sítapur district and cousin of the Deputy Commissioner mentioned above, had some experience of sericulture and was the chief agent in carrying out the work of experiment. The China worm, the Desi or Bengal worm, freshly-imported Kashmir worm, and acclimatized Kashmir worm were all tried from 1861 to 1866, and the Rája of Koel, the Tahsíldár of Biswan, and the Manager of the Mahmudabad Estate, all took an interest in the novel enterprise. The experiment raised high hopes of success in the beginning, but eventually was discontinued, the reason probably being that it had not taken sufficient root among the people to go on developing after the personal example of its zealous promoters was removed from their eyes.

Dr. Bonavia and the Kashmir silkworm.

42. Dr. Bonavia himself performed three kinds of experiments with the Kashmir silkworms: first, he reared them artificially with results similar to those of Mr. Lindsay in Hardoi; second, he reared them in the open air *à la Nature* both on the China mulberry with large and crumpled leaves, and on the native or *Desi* mulberry: the former was found best for the first stage of the worm and the latter for the succeeding stages; third, he induced natives of Oudh to rear the worm at home and reel the silk.

43. He sums up his conclusions as follows :—"The Kashmir silkworm can live and produce good silk in Lucknow ; the native mulberry common to the province is quite sufficient as a feeding material, though other kinds may be very useful; 24 natives from different parts of Oudh, who never saw a silkworm before, have become acquainted with silkworm rearing, and about six of these with the mode of reeling ; and two of the latter have become reelers, by means of whom many others may be taught."

His conclusions.

44. Dr. Bonavia performed another experiment on a small scale with the China silkworm in the cold weather of 1862-63, but the result was a total failure. He attributed the failure to the unseasonableness of the time at which the eggs were hatched and repeated the experiment in the rains of 1863, when he produced cocoons equal, in the opinion of a Bengali reeler, to the Bengal cocoons of China stock. A small experiment with the Madrási silkworm in May of that year was a failure.

Another experiment, 1862-63.

45. The Oudh experiments were a failure, partly because they were not conducted continuously on one centrally directed plan, and partly because the period when most energetic efforts were made was a period when the mulberry silkworm was in all parts of the world suffering from an unparalleled outbreak of disease which had not yet been sufficiently investigated and for which no remedy had yet been found. The suitability or unsuitability of the climate is still an open question, with the probabilities inclining to the affirmative supposition, as indicated by Rája Rámpál Singh's experiment (see section 77, *seq.*)

Causes of failure.

46. The history of sericulture in Dehra Dún is interesting. In 1870-71 Captain Murray of the Invalid Establishment attempted the rearing of the silkworm in the Dún. He tried both the Multivoltine and the Univoltine species, but did not find the former answer well ; two and-a-half of the cocoons of the Univoltine species were equal to six cocoons of the other, and they also fetched remunerative prices in England. Captain Murray laid out a large sum of money in planting mulberry trees and possessed several acres of ground stocked with the best kind of mulberry. He was in hopes of receiving Government assistance ; but this was not granted, and the fair promise which his experiment had held out was not fulfilled on account of his nearly relinquishing the business.

Dehra Dún sericulture.

47. Mr. H. G. Ross was then Superintendent of the Dún. He had already, as Deputy Commissioner of Sítapur in Oudh, reared silkworms with some success. We have already seen how the Oudh districts were familiarized with sericulture in the Sixties, thanks to the energetic efforts of Dr. Bonavia. Mr. Ross was an officer of the old type ; while he governed a district, he considered it his home. He had, moreover, devoted long periods of his furlough to the investigation of the production and manufacture of silk. He bought up Captain Murray's stock, and made strong representations to Government for a grant for the official encouragement of sericulture, which, after being submitted by the Local Government to the Government of India, received sanction.

Mr. Ross.

48. In July 1875 after a three years' trial of sericulture in the Dún, Mr. Ross submitted his results to Messrs. Gillanders, Arbuthnot and Company of Calcutta, who reported their opinion to Government. The silk was white, the cocoons having lost colour as soon as they were put into hot water. The outturn of silk was four seers to the maund of cocoons. The thread was very strong and wound off smoothly with hardly any breaks, and there was very little *chashm* or waste.

Encouraging result in 1875.

49. Encouraged by his first success, Mr. Ross, in developing his scheme, submitted further proposals in August 1875, which were sanctioned. They comprised :—

Further proposals.

(1) the expenditure of Rs. 28,876 from provincial revenue, to be spread over four years;
(2) the lease of a farm of 80 acres;
(3) the importation of seed from Japan and Kashmir; and
(4) the appointment of Lieutenant-Colonel Ouseley of the Oudh Commission as Overseer during this officer's two years' furlough.

Mr. Ross planted enough mulberry trees to start his scheme; but on his taking leave for England the whole work remained practically in abeyance. Mr. Ross' *locum tenens* knew nothing of sericulture, and Major Ouseley's successor had never seen a silkworm reared in his life; both the mulberry trees and the insects suffered in consequence. But Mr. Ross on return from leave resumed the experiment. He began, however, in 1877 practically *de novo*, and produced four maunds of green cocoons from four ounces of seed. The cocoons were light, but the silk was good. Mr. Ross, however, did not have it reeled in the Dún.

Operations of 1878.

50. The operations of 1878 were still more successful; but the acclimatized varieties gave better results than the imported seed from Kashmir and Japan. Reeling was also attempted with the help of a professional reeler imported from a Bengal prison, and 44lbs. of silk was reeled off. The year was also signalized by the first experiment with the system of cottage cultivation, by which seed is given out to villagers who take it home, hatch it, rear the silkworms to the stage in which they build their cocoons, and bring back the produce in the form of these green cocoons, for which they get payment by the weight of the crop raised by each man. Mr. Ross gave the following statement of proportions, which might be interesting in this connection:—

(1) Green cocoons to ounce of seed, Kashmir ... 85⅓lbs.
Acclimatized Japan ... ... 69½ „
Imported Japan ... ... 60½ „
(2) Green cocoons to dry, as a rule 3 to 1.
(3) Hatched cocoons to seed, 2lbs. to an ounce.
(4) Pound of silk to maund of dried cocoons—
Acclimatized ... ... 14¼ „
Japan ... ... 12¼ „
Kashmir ... ... 12¼ „
(5) Area of rearing shed to ounce of eggs, 230 square feet.

Of 1879.

51. The year 1879 was not so successful. A newly-purchased steaming apparatus for drying the cocoons was not properly understood, and the seed was brought down from the hills prematurely; but in spite of these adverse circumstances two facts were placed beyond doubt, (1) that a cocoon of high value could be raised in the Dún and (2) that the lead given by Government was likely to be followed by the people. It was in this year that the first agent of Messrs. Lister & Co. of Manningham Mills, Bradford, arrived from England in the person of Mr. Lepper. This firm, after the experience gained during the period of the silkworm epizootic in Europe, sought for new fields for their sericultural enterprise in India, and herein may be traced the beginnings of the Lister Grant, which we proceed to describe.

Mr. Lepper.

52. Mr. Lepper after inspecting the establishments came to the conclusion that the experiments would pay well, and the operations of 1880 were superintended by him, though the financial responsibility still rested with the Government. A great stimulus was given by Mr. Lepper to cottage cultivation by means of advances of capital and prizes for good results and medals to all the villagers who brought in their produce at the end of the season. The estimated outturn was about 30 maunds.

Lister Grant, 1881.

53. In 1881 a grant of land 3,472 acres in extent (henceforward called the Lister Grant) was assigned to Messrs. Lister & Co. at Majri in the Eastern Dún on certain favourable conditions as to the payment of Government revenue. The deed of grant stipulated that

bonâ fide silk operations were to be commenced within five years, and these were defined to mean "a mulberry plantation of not less than 50 acres, and the expenditure of Rs. 4,000 on buildings and irrigation canals." At the end of 10 years, provided that the grantees had 10 per cent. of the assessable area under three-year old mulberry trees, they were to retain the whole grant on condition that they turned out at least 100 maunds of cocoons annually. On this sole condition the grantees were to become proprietors of the land If the conditions were not fulfilled, the land was liable to be resumed by Government with all buildings, crops, plantations, and fixtures, provided that after the lapse of 10 years, if the grantees wished to discontinue silk operations, the land was to lose its favoured character and become ordinary land, subject to revenue assessment and capable of being either sold or retained by the grantees.

Operations of 1880-81.

54. The net result of the operations of 1880-81 was a produce of 12 maunds 24 seers raised by villagers and 8 maunds and 13 chhatáks, by Messrs. Lister & Co. at a net expense to Government of Rs. 163-7-5. Two new varieties of the silkworm were introduced during the year, *viz.* the Multivoltine breed of Bengal and the castor-oil silkworm (Eri) from Assam. The former produces crops practically throughout the year, and the latter has this advantage in its favour that the castor-oil plant which forms its food matures within three months of its being sown and is hardier than the mulberry. Mr. Lepper having been transferred to Assam, the company was now represented by Captain Murray. By this time the grant came into force The old Government factory, sheds, bungalows, and mulberry trees planted by Mr. Ross on the canals, roads, and reservoirs, were also placed at the disposal of Messrs. Lister & Co., and the Government experiment merged into an outlying establishment of a well-known firm in England.

And of 1882-84.

55. From 1882 to 1884 further progress was made in planting mulberry trees and providing rearing accommodation. The Sahárunpur Government Botanical Gardens also assisted largely in the development of sericulture. At the same time the prices paid for green cocoons produced by the villagers was reduced from Rs. 40 a maund to Rs. 20 per maund. This step seriously affected the prospects of cottage cultivation, which henceforth declined until within two or three years it all but died out. The results of the three years' operations may be thus summed up:—

	By the firm themselves.			Through village agency.		
	1882.	1883.	1884.	1882.	1883.	1884.
Seed laid down	About. 11¾ oz.	Figures not available.	15¼ oz.	4 oz.	Figures not available.	Figures not available.
Green cocoons produced	ds. s. 8 21		Mds. s 13 18	Mds. s. 1 0		
Proportion of seers of green cocoons to ounce of seed.	0 30		0 33½	0 10		

Financial success.

56. The financial success of the operations of 1884 may be gauged by the fact that 1,076 lbs. of green cocoons were produced at the rate of 67 lbs. to an ounce of seed at a total cost of Rs. 110-9-5, while the cocoons reserved for seed produced 20 lbs. of seed, worth, at Rs 5 per ounce, as much as Rs 1,600.* This of course takes no account of the capital outlay.

* Report of the Department of Agriculture and Commerce, North-Western Provinces and Oudh, for the year ending 30th September 1884.

Cottage cultivation.

57. Cottage cultivation was now abandoned on the Lister Grant on the initiative of the owner of the estate himself. Lord Masham (Mr. Lister) visited the grant in 1883, and with his European ideas of the silk industry he was dissatisfied with the slovenly methods he saw practised by the villagers in their homes. He vetoed the idea of cottage cultivation, and went back to the system which had been given up in Europe years before, of *Grandes Magnaneries* (see extract from Professor Maillot's work in Mukerjee's European diary No. 110, dated Berhampur, 23rd October 1886).

Abandoned.

58. Lord Masham's supposition was that with cheap labour and good European supervision the objections to the *Grande Magnanerie* idea could be overcome. The settlement of tenants was therefore discouraged; a plantation of 1,000 acres of mulberry trees was laid down; large rearing establishments 100 feet long and 20 to 24 feet broad were built at a cost of nearly Rs. 1,000 each, until there were 27 of them on the estate, and a native establishment of about 400 men and boys at an average monthly pay of Rs. 5 each was kept up from November to the end of April year by year. Money was spent liberally, almost extravagantly, on the venture, and it is estimated that up to 1890 between six and seven lakhs of rupees was sunk in this branch of the business. A large filature with boiler, turbine, and the best French machinery was erected in anticipation of cocoons coming in, while rearers and reelers were imported all the way from Pathánkote, whose fares alone, coming and going every year, must have cost the establishment a handsome sum. In 1892 Mr. Pink, then in charge, pointed out the error of this policy; but his idea did not prevail, and in 1893 he was dismissed.

Period of transition.

59. No official records are available as to the production on the estate during the years after 1884. The period of liberal expenditure on silk establishments was succeeded by a transition period during which the firm hesitated as to the right policy to adopt. During the transition period the estate was developed agriculturally by the encouragement of settlers; but the silk operations went into the background. From 1894 to 1896, only one or two ounces of seed was laid down each year. Without cottage cultivation it was found difficult to work sericulture successfully

Cottage cultivation resumed.

60. At length in 1896 Mr. Pink resumed charge and gradually commenced giving effect to his ideas. In the spring of 1897 three of the tenants were found to accept the overtures made to them. They reared a small quantity of worms, but more tenants were induced in the rains to take up the rearing of the Multivoltine. In the spring of 1898 about 24 tenants took up the industry, and in the rains the number increased to between 50 to 60: while at present there are quite 80 rearing the European spring crop. Though every tenant on the estate is not at present rearing silkworms, Mr. Pink is working with that idea in view, and the only hindrance to it at present is the scanty supply of mulberry leaf. Probably, if the tenants and landholders of the surrounding villages outside the Lister Grant took up sericulture (Mr. Pink is prepared to give out seed free and buy fresh cocoons at from Rs. 20 to 30 per maund), the question of the food supply for the insect would be solved, because there are a great many mulberry trees on the Dún roads and canals planted in the time of Mr. Ross. The difficulty comes in when the food of the worm has to be carried to a distance. About three to five miles is the utmost limit to which it would pay to carry leaves.

Efforts to make sericulture popular.

61. Nor are efforts wanting on the part of the management to get into touch with their tenants and make sericulture popular. A small savings bank has been started on the estate on the principle of self-help.* It is well known what exorbitant rates of interest are charged by the village *bania* to the poor cultivators

* See the *Pioneer* of 5th October 1898.

and what devices he adopts to make his charges still higher than they appear to be. On the Lister Estate a tenant could take up a Rs. 5 share and deposit cash after harvest or whenever he has extra earnings. When the sowing season comes round and he wants to purchase seed or plough-oxen, or when there is a wedding in his house, he can borrow money from this Bank, in which he is himself interested, on easy terms. The scheme is small and at present in its embryonic stage; but its progress will be watched with interest But this brings us to the sericulture of the present day.

62. It is not necessary in this Monograph to more than mention isolated experiments at sericulture made in these provinces independently of Government. Mr. Geoghegan (page 102, ed. 1880) mentions that in the Moradabad district some very fine silk was reeled by Captain White and exhibited at the Roorkee Agricultural Show in 1864. There was, again, a silk concern started in Dehra by Colonel Utterson in 1882. A private gentleman attempted sericulture in Muttra district in 1895 and in Agra in 1897. These experiments all quietly died out, and none of them has left any mark on provincial sericulture.

Other experiments. (i.) By private individuals.

63. But the attempted introduction of the *Eri* silkworm by the Department of Land Records and Agriculture deserves mention. In June 1894, under the orders of Mr. H. Z. Darrah, while officiating as Director of that Department, some live cocoons of Eri silkworms (Attacus Ricini) were obtained for rearing purposes from Assam. The silkworms were reared at the Government Farm, Cawnpore, and fed on the leaves of the castor-oil plant. They produced five cycles up to the beginning of April 1895, and thrived well until then, yielding cocoons similar, and even superior in quality, to those obtained from Assam. The experiment ended with the arrival of the hot weather. The moths that emerged from the cocoons in the beginning of the hot season died in considerable numbers before laying eggs. Those that escaped death at this stage laid very few eggs, and the worms that emerged from them died altogether in course of a week. Cocoons and worms had also been distributed for rearing to private persons in the neighbourhood of the Cawnpore Farm and in Lucknow, and with them, too, all the worms died by the 10th of May 1895. The experiment was, however, resumed and a fresh supply of 100 live cocoons was obtained from Assam towards the end of August 1895. The moths came out as usual and laid eggs which produced 1,400 worms. These were sickly and dull. The weather was hot, and artificial measures were taken to keep as low as possible the temperature of the various rooms to which they were shifted one after another. A disease broke out, in consequence of which they died in large numbers. Only 779 cocoons weighing 20 ounces were in all obtained from this breed. The second cycle was a poor one, and the third was a total failure, as the worms were killed by the heat. In view of these discouraging results the experiment was given up in 1896. This worm, however, has been found a success on Rája Rámpál Singh's Estate (see section 77, *seq.*).

(ii.) By Department of Land Records and Agriculture.

64. An attempt with the Eri silkworm was made by another Government Department, *viz.* the Educational Department of these provinces. They attempted to popularize sericulture in the year 1894-95 but discontinued the experiment the following year on account of the fall in the price of Eri silk. The Director of Public Instruction in his general educational report for 1894-95 (paragraph 205, page 60) explained the object held in view by these experiments in these words :— "The care of silkworms will be to village schoolboys an interesting occupation outside their school work, an object lesson for the education of their faculties of observation, a training in thoughtfulness, and in punctual attention to daily recurring details, and it may become in the end remunerative, if not lucrative, as a village industry."

(iii.) By Education Department.

Present position of sericulture in the provinces. Three experiments now.

65. At the present day there are three notable experiments which are being performed in these provinces under totally different conditions as to climate and management. One is at Chakráta (more than 7,000 feet above the sea level) and Deoban (9,347 feet above the sea level), in a temperature comparable to that of the countries of Central and Northern Europe. This experiment is under the auspices of the Forest Department, and has been commenced more recently than the other two. The second experiment is being carried on on the Lister Estate in the Dehra Dún valley about 2,000 feet above the sea level and in a temperature which at certain times of the year resembles that of Italy. This experiment is of some standing, and its beginnings and progress have already been traced. It has behind it the vast resources of a first-class English silk manufacturing firm, and expert knowledge, both scientific and commercial. On the other hand it is hampered by the fact that its direction has often been out of touch with local conditions. The third is being conducted on the plains by entirely native agencies, and under conditions which are not different from those to be found anywhere in the plains of these provinces. This is the experiment which owes its origin to the enterprise of the Honorable Rája Rámpál Singh of Partábgarh district.

(i.) The Chakráta experiment.

66. The forest experiment at Chakráta cannot be better described than in the words of the Forest Administration Report for the year ending 30th June 1898, School Circle, paragraph 39 :—

"At the desire of the Inspector-General of Forests an attempt was made during the year to rear the silkworms of the North China moth *Antheræa Pernyi*. In its native country it feeds on two oaks, *Quercus robur* and *Quercus dentata*, and the problem was to rear it on one of the Himálayan oaks. The cocoons were received in December 1897 and sent to Chakráta, many of the moths having already emerged in transit. Soon one by one they all came out, and after pairing, the females began to lay eggs and eventually from these eggs worms hatched out in April and May. They were first tried at Chakráta and fed on leaves of the "ban" oak, *Quercus incana*, and "moru" oak, *Quercus dilatata;* but they did not succeed on this food, so they were tried with the high-level oak, *Quercus semicarpifolia*, which fortunately seemed to suit them. As the temperature at Chakráta was too high and food trees too far away, they were then moved to Deoban, and after undergoing the usual moults, 182 of them spun cocoons. Next year no doubt in due course these will produce moths, and the life round will begin again; but as we shall know more about their requirements, we shall be able to obtain a better supply of silk. It is unfortunate that they cannot be kept at a lower level than 8,000 feet, so that it is unlikely that the breeding of silkworms will be taken up by the people of Jaunsár."*

(ii.) Present position on the Lister Grant. A.—Method.

67. As to the Lister Grant, the present position of affairs is more hopeful probably than it has been at any time since the experiment was started. A number of European tenants are engaged in the work of sericulture, and thanks to the complete recognition of the principle of cottage cultivation, success seems to be

* The latest report, however, on this experiment is discouraging. Mr. B. B. Osmaston, Deputy Conservator of Forests, Jaunsár Division, in a letter dated Chakráta, 10th August 1899, to the Conservator, School Circle, received after the manuscript was sent to Press, says :

"I see no prospect of the cultivation of Antheræa Pernyi ever becoming a financial success in these parts.

"Experiments have now been carried out during two successive years in Jaunsár, and the results are not encouraging.

"The only indigenous oak which the caterpillars will feed upon in these hills is the „kharshu" (*Quercus semicarpifolia*), and even this species of oak does not seem to suit them very well, as many die before reaching maturity. Moreover, the „kharshu" oak, growing as it does at very high elevations, precludes the possibility of obtaining two crops of silk in the year owing to the cold.

"As a matter of fact the stock of the insect is decreasing with each experiment, and the individual cocoons are inclined to decrease in size

"No silk has been reeled up to date as the number of cocoons obtained was small."

all but assured. Mr. Pink is working on the maxim that the secret of success in sericulture is to rear small quantities only by a large number of persons (Preface, pages 7-8—Riley on Silk Rearing). Grass sheds 20 feet by 20 feet, at an average cost of Rs. 15 each, are better suited to the local conditions than the large *Magnaneries* which were in favour at an earlier stage of the experiment, when as much as 60 ounces of eggs would be reared together. The Multivoltine breeds of Bengal have been tried, but they do not pay to the same extent as the Univoltine breeds of Europe. Last year Mr. Pink purchased about 22 maunds of Bengal cocoons which only produced about 14 seers of raw silk, of poor quality and low value. It is supposed that the Bengal worm prefers the shrub mulberry of the lowlying plains of Bengal to the tree mulberry, which alone is available in Dehra.

B.—Worms used.

68. The *Eri* silkworm has also been tried on the estate before, but Mr. Pink says that he has no experience of it. He has found some difficulty in procuring the eggs of this species; but he hopes to establish it on the estate. The only question is whether the climate of the Dún may not be found too cold for the Eri silkworm and the castor-oil plant on which it feeds. The castor-oil plant is found in Dehra, but not in sufficiently large quantities.

69. Great caution is observed in seeing that contagious diseases such as *pebrine, flacherie*, and *muscardine* are avoided by a careful miscroscopic examination by Mr. Pink himself of seed before it is selected for breeding. Mr. Pink takes no notice of *grasserie*, a disease from which several of his worms have been found to be suffering. He ascribes it to heat; it is neither contagious nor hereditary.

Caution in selecting seed.

70. The reproductive stage is supervised by two or three selected servants. The rearing is done by tenants as an auxiliary occupation, their chief employment being agriculture. Including women and children, about three hundred persons are estimated to be engaged in the process of rearing. The reeling is not at present on an extensive scale. It had been altogether suspended, but has been started again, and about 12 or 15 boys can reel and about 20 more attend at the works to pick up the method. The most approved machinery from France is on the estate, and it will be utilized as soon as sufficient material is forthcoming. Amongst the people employed are Muhammadans, Bráhmans, Rájputs, Doms, Gurkhas, Chamárs, Lodhs, Bharbunjas, Mális, Gwálas, Pásis, and even the ubiquitous Bania. Both hillmen and plainsmen take an interest in the work.

C.—Division of labour.

71. The total capital put into the concern has been about six to seven lakhs, but a great deal of it has been wasted on account of a misunderstanding of local conditions in the past; and it remains to be seen whether under the new system of management the business will attain to the dignity of a weaving establishment—the goal looked forward to by Mr. Pink. From his report I gather that the property belongs to Lord Masham; Messrs. Lister & Co., being now a limited liability company, are said to have no concern with the grant. Any success now achieved will be to the credit of only that amount of capital which has not been swallowed up unproductively in the pursuit of a wrong method.

D.—Capital employed.

72. The payments to the tenants engaged in sericulture amounted for the last crop of Bengals to Rs. 486-9-6. It was divided amongst 51 persons. The individual earnings ranged from Re. 0-1-6 to Rs. 47-4-9. Of course some people got no payment: for example those who allowed their worms to be eaten by ants or rats, and one heroic individual who roasted his eggs to prevent their hatching. The crop was reared in about 24 days, and entailed labour ranging from an hour a day at the commencement to about six or eight hours at the conclusion of the rearings. The next preceding crop cost about Rs. 150, which was divided amongst 27 men.

E.—Payment in labour.

F.—Disposal of produce.

73. The exports from the estate amounted last year to 2¼ maunds of ordinary raw silk (the weight of green cocoons was of course much greater), leaving five maunds of waste *(chashm)* to be forwarded to Bradford to be used up by Messrs. Lister & Co. in their gigantic silk works. The silk finds a ready sale in Calcutta; but better terms have been recently offered by Trichinopoly manufacturers, with whom Mr. Pink hopes to deal in future. The raw silk fetches from Rs. 10 to Rs. 16-12-0 per factory *ser* of 72 tolas.

G.—And of seed stock.

74. As to the supply of seed, every year a certain quantity of eggs after microscopic examination is washed off the papers and placed in small bags of an ounce of grain each. The bags are then sent up to Mussoorie or Landaur about the month of June, where they are placed in the coldest situation available. Last year they were lodged at the very top of the Lál Tibba in Landaur (elevation 7,459 feet above the sea level). About the 1st of February they are brought down into the valley, and on the 14th they are placed in the hatching chamber, where they are exposed to a heat which is gradually raised to about 78° to 80°F.

Which is reinforced from time to time.

75. The crop is raised and ready by the end of April; but the examination of seed and the drawing out of silk carries on the industry far into June. The operations are in abeyance in the rains. Mr. Pink's idea is that as the microbes which produce diseases in the silkworm live about six to eight months only, they would be killed off if the rearing operations are suspended during the nine months from April to February. Every two or three years fresh seed is imported from Europe or other silk-producing countries to stiffen the breed, which is liable to degenerate if not reinforced. For example a small quantity was imported this year from Smyrna out of Mrs. Griffith's crop of prize cocoons. The proportion of green cocoons they yielded to seed is said to have been 78 kilogrammes to 25 grammes of grain, which gives the extraordinarily large proportion of 97½ seers to 1 oz. of seed. This exceptionally fine result may be compared with the figures given in sections 50 and 55.

Mr. Pink's propositions.

76. Mr. Pink sums up the principles followed by him on the Lister Estate as follows:—

"1. To secure good seed at commencement.
"2. To ensure the rearings of the tenants being done with good grain by retaining the supply strictly in my own hands.
"3. To limit the supply to one ounce per family for each rearing.
"4. To supervise the rearings in a general way and see that each tenant rears separately.
"5. To make large use of the microscope for my own rearings."

These principles have a wider application. They indicate the conditions of success to which attention should be directed in any commercial undertaking connected with sericulture in these provinces.

(iii.) Rája Rámpál Singh's experiment.

77. The Honorable Rája Rámpál Singh's experiment does not stop with the silkworms merely. He also manufactures silk fabrics, though the industry is in its infancy and hitherto the fabrics produced have not been offered for sale.

Three worms used.

78. A factory was started three years ago at Kálakánkar, and subsequently a branch was opened at Dharupur, both in tahsíl Kunda of district Partábgarh. Both mulberry and *Eri* worms are reared all the year round. Of the former kind the breeds selected are—

(1) The Bombyx Fortunatus (the Bengal worm);
(2) The Bombyx Crœsi.

Of the latter kind is the "Attacus Ricini."

79. *The Bombyx Fortunatus.*—Its seed is both locally produced and obtained from Rajsháhi in Bengal, from which the first supply was obtained. A frequent interchange of seeds is maintained with the Rajsháhi factory. The seed is received on rolls of paper, to which it is found adhering in circular groups of tiny yellowish specks resembling ants' eggs. In the hot weather, for fear of hatching during the transit, the seed is transmitted in the shape of green cocoons. Ordinarily, when the thermometer stands between 75° and 85°, it takes seven days to hatch. As the temperature falls, the period of hatching extends from eight to 20 days. Artificial heat has sometimes to be given to accelerate hatching: a milkmaid is employed to warm the eggs by the heat of her person, under her armpits or in her *angia* (bodice).*

A.—Bombyx Fortunatus. Seed.

Hatching.

As the ova approach maturity they gradually change colour from yellow to sulphate of copper, which augurs the exit of the worms. A day or two before the exit, the paper containing the seeds is given a light dip in a solution of sulphate of copper, one chhaták to 99 chhatáks of water. This is done to divest them of any disease that they might have contracted during the egg state.

80. On being hatched, the caterpillars appear smaller than ants. Tender mulberry leaves are gently put over them entire, to which they speedily crawl. These leaves with the caterpillars on them are then transferred to other rolls of papers which are deposited over dálás, *i.e.* circular or square flat trays made of bamboo matted work, the edges slightly raised upwards. There are sometimes worms which do not crawl to the leaves owing to weakness; they are lifted by means of quills and transferred on to the dálás. Here the caterpillars are provided with fine cuttings of tender mulberry leaves which they begin to eat at once. During the day these cuttings are given three or four times, a limit gradually increased as they eat and grow; and during the night only once before retiring to rest. In the hot season the leaves have to be given oftener, not because they consume more, but because the leaves dry sooner and become unfit for eating. Sanitation is attended to by changing the dálás once daily. A piece of cotton netting is thrown over the dálás and the mulberry cuttings are thrown over it. The caterpillars at once mount the leaves through the netting, which is then lifted and placed in another dálá. The first dálá thus vacant is cleaned, washed, and made available for use on the next occasion.

Larva or caterpillar: its food.

81. The dálás are arranged on a wooden rack divided into compartments four feet by one foot. The rack is fitted about three feet from the ground against the walls of the rearing house which is 15 feet by eight feet, the horizontal beams being let into the walls, and only the post pillars resting on the ground, in little masonry hollows or saucers which are always kept filled with water. This is to prevent obnoxious insects crawling over to the rack. The rearing-room is provided with skylights and windows high up in the wall and with folding doors on all sides protected by wire netting. The doors are generally kept open during the hot weather and the monsoons, but closed during the cold weather. The temperature is artificially regulated by the use of *khas tattis*† and by the frequent sprinkling of water on the ground and walls during the summer and by charcoal burnt free of smoke during the winter. A thermometer is kept constantly in the room and consulted every now and then, and proper arrangements for air and light, heat and cold, are made according to requirements.

Dálás or baskets and rearing sheds.

82. For the first three days after hatching, the caterpillars continue eating away the leaves, actively going from one leaf to another, but on the fourth day they cease eating and moving and

The four moults.

* This primitive device for hatching by artificial heat has been practised universally in the East. It is known in Kashmir and is referred to in an Arabic book called the "Ajáib-ul-makhlúqát" ("Wonders of Nature").

† Screens made of the roots of a weed, the *Andropogon muricatum*, which emits a cool fragrance when moistened with water.

lie still. A sort of lethargy overtakes them, and a thin coating of some resinous substance overspreads their body. In this state they lie for 24 hours and are said to be in their first moult, at the end of which they throw off their coating and emerge grown as big as ants. They now become active again, more active than before, and devour leaves with avidity for the next three days, after which their second moult begins, lasting, as before, 24 hours. After the second moult they grow as long as a barley corn. Now their principal organs, such as feet, mouth, and eyes, become discernible on close observation. After a period of three days' activity, their third moult follows, lasting the same time as before, at the end of which they grow about two-thirds of an inch in length and more developed in thickness, the parts of the body being clearly distinguished; black dots being visible on the sides of the body and red specks on the face. The main body is black after the first moult, turning slightly bluish at the second, and getting blue at the third moult. This last colour remains to the end. Another period of 24 hours is occupied in the fourth and last moult, after which the worms are about one inch in length and one inch in thickness at the middle. As the worms grow stronger with each moult, bigger and bigger choppings of leaves are given for food, till at the fourth moult they can eat whole leaves with stems attached. The use of netting is now dispensed with; for they can be removed by hand or by means of the stems of the leaves on which they feed. For full seven days after the fourth moult they continue to devour leaves night and day, at the end of which period they abruptly leave off eating and their movements indicate a desire on their part to seek a place for cocooning. By this time they have grown 1½ inches in length and proportionately in thickness and become very soft to the touch and glossy in appearance. The period thus taken from the egg-state to the commencement of cocooning is ordinarily 23 days, but inclemency of the weather may delay the hatching, and make the period slightly longer.

Cocooning.

83. As soon as readiness to cocoon is observed on the part of the worms they are transferred by hand to the cocooning dálás. These are circular flat trays made of thick bamboo matting, and divided and sub-divided into smaller compartments about four inches square. The worms are first exposed to sunshine for about 10 minutes, in order that they might divest themselves of their excreta, which office if they performed within the cocoon, the silk would be spoiled. Being placed in the cocooning trays, sometimes two or three in one compartment if there is room, they at once plant themselves firmly on the spot and commence cocooning. The trays are then put in a nearly upright position on the ground, resting against the walls of the rearing-house. The skeleton cocoon is finished in about two hours, but the main work of spinning is continued and takes about two days. The worm then rests in its cocoon for five days, the cocooning period during which they are let alone being seven days in all.

Selection of seed cocoons.

84. As soon as the cocoon is completed, *i.e.* two days after the worm has entered its silken enclosure, a selection is made for seed. Good, healthy, and fully developed cocoons are set apart for seeding. These are strung together in the form of a garland or rosary, the cocoons being pierced with a needle carefully so as not to injure the moth within, and suspended from wooden pegs let into the walls of the rearing house. Other cocoons which have not the good fortune of having "caught the judge's eye," are thrown in a mass into a basket and exposed to the sun's heat for two hours (during which the moth is smothered and dies), and made over to the reeling department.

Moths.

85. The seeding worm, in emerging, pierces the cocoons and comes out as a moth with wings. It is now three-quarters of an inch in length and its colour has completely changed from the blue of its caterpillar state to creamy white. The males are thinner and more active in their movements than the females. They at once begin to pair. The female is strictly monogamous; but the male is allowed more latitude in consideration of his

shorter life, for he dies within 24 hours after pairing. The pairing season goes on for about six hours. Shortly after pairing the female begins to lay eggs and continues laying for two days. The females laying eggs are put on sheets of paper and shut in under circular earthen cups provided with small ventilating holes. A female lays from 300 to 400 eggs in the course of two days, after which she dies. The cup is removed after four days. The eggs, which are naturally laid in rings or circlets, are marked and numbered and the dead bodies of each female scientifically examined.

Examination for disease.

86. The method adopted is that the carcase is dipped in a solution of sulphate of copper and squeezed, and the liquid substance thus obtained is thrown on to a piece of glass where it immediately spreads. This liquid on the glass is then examined with a microscope by an expert, who, as he examines each body, pronounces the existence or absence of disease. As the eggs have all been numbered, it is easy to separate those of diseased moths, which are thrown away, from those of moths pronounced free from disease, which are preserved for rearing

Length of cycle.

87. This completes one cycle of the insect. The whole period comprises about 33 days, of which the stages may be summarized as follows:—

In the form of eggs (indefinite time).	
In the four moultings with intervening periods in the worm state	16 days.
Period of maturity	7 „
Period of cocooning and resting in cocoon ...	7 „
Pairing and laying eggs in the moth state ...	3 „
	33

During the cold weather two crops can be produced. During the hot weather six crops are the rule. Thus in a normal year eight crops are usually produced, but this may be reduced to seven crops if the temperature is lower during the greater part of the year.

Bombyx Cræsi.

88. The *Bombyx Cræsi*, locally known as "Nistri" or "Madrási," is the next breed reared in the factory. It is also a Multivoltine species, and resembles in nearly all respects the Fortunatus, with the following exceptions. The head of this caterpillar when it developes during the moults is reddish, and the black dots on the sides of the body are comparatively larger. In the *Fortunatus* the head is brown and the dots are smaller. The *Cræsi* worm takes 21 days to complete its moults against 23 of the Fortunatus, the other periods being nearly the same. The cocoons are also of the same size as those of the *Fortunatus*, *i.e.* three-quarters of an inch in length and half an inch in diameter in the middle.

Eri silk-worm.

89. *Attacus Ricini*, known as the "Eri," of Assam. This insect, too, is a Multivoltine, but it feeds on the leaves of the castor-oil plant. The seed is imported from Assam through the Director of Agriculture and Commerce in the shape of cocoons. The eggs do not stick to paper and are rather irregular in hatching; hence it is considered safer to import green cocoons for seeding purposes.

Life-history.

90. Ordinarily they take from four to five days in transit from Assam, and the moth begins making its exit in three or four days. A peculiarity of this moth is that it does not pierce the cocoon in the middle as the mulberry insects do. Its cocoon is by its composition provided with exit holes at both ends, through which it comes out. The moth is distinguished by its blue wings dotted with black. The males are lithe and active, while the females are heavier and slow. They are rather tardy in pairing, and the rearer has to put them together for about two hours before they consider themselves introduced.

91. After pairing, the female begins to lay eggs for which it is put on a sheet of paper spread on a dálá. The eggs do not stick to the paper, and being removable, are put into paper folded like a cone somewhat in the shape of the paper cones in which sweetmeats are distributed to Indian schoolboys on prize days, except that the base is left more open for ventilation. The eggs of the species are rather irregular in hatching, which commences generally after seven days, the sign denoting the approach of hatching being, as usual, their turning to sulphate-of-copper colour. The paper is then unfolded, and placed flat on a dálá, and tender castor-oil leaves are placed over them. As many as hatch crawl to them and are removed to separate dálás and the process goes on till they all complete their hatching. After this the usual period of activity and lethargy as mentioned in paragraph 82, follows, with all the four moults. This breed is sturdy and it is not necessary to supply them with cuttings of leaves, nor to examine the eggs scientifically, for they enjoy comparative immunity from disease. Immediately after hatching they are free from dots or specks and are of the colour and size of small ants.

Eggs.

92. After the second moult they turn yellow, and after the third moult some get pure white and some bluish. At the fourth moult the colour becomes more pronounced, and they grow about two inches long. Then follows the usual period of cocooning. The cocoons of white insects are white, and of the blue insects of pink colour, and the silk produced is of the same colour; but the pink is replaced by the natural white colour after the process of bleaching and boiling. The method of rearing and the number of crops produced, subject to variations according to variations in temperature, is the same as in case of the *Fortunatus*.

Moults.

93. The cocoons for seed for the next crop are kept alive by being placed in the underground chambers of a *báoli*,* where the humid atmosphere maintains a comparatively low temperature. The cocoons for the production of silk are removed from the cocooning trays before the exit of the moth and made over to the reeling department.

Seed cocoons.

94. The silk produced by both the mulberry and Eri insects is of a white colour. The former, however, is very soft and glossy and requires more care in reeling. The latter is coarse, though it is stronger and more durable.

Silk.

95. Hitherto we have dealt with experimental sericulture. Now we pass on to the well-established industry of collecting the cocoons of the wild Tasar in the Mirzapur district. The insect is called by no special name; the industry is generally spoken of as relating to the *Koa*, which literally means a cocoon. This term, however, is sometimes applied loosely to the Tasar worm itself.

Tasar industry in Mirzapur.

96. The industry, which is chiefly in the hands of aboriginal tribes, such as Kols, Kharwars, and Turan tribes, suffered severely in the famine of 1896-97. The estimated annual average for normal years has been 4,000,000 to 5,000,000 cocoons; but in the famine a great many people employed in the industry emigrated and the consequent displacement of population reduced the figures to about 2,000,000 during the last collecting season.

Men employed.

97. The collections are all made in the wild country towards the south of Ahraura beginning with the jungle by the river Sôn, and going on to Dúdhi and the extreme south. The *mallahs* (boatmen) of the Sôn river also take their share in the industry.

Tract of country.

98. From the Kártik (November) crop good, large, strong cocoons are selected by the collectors and put in earthen vessels and brought home. The collectors divide the tract in which the cocoons

Cocoon collecting.

* A sort of well in which the water is approachable by means of a series of steps underground; there are also usually several layers of subterranean chambers or galleries which maintain a very low temperature in the hottest weather.

are found into circles, each man having the right to collect from his own circle. The zamíndár is paid certain dues for this, as for other forest products. From 300 to 400 is the number of cocoons brought by each man for rearing purposes.

Rearing the worm.

99. They are put in earthen vessels in groups of five, tied up at the twigs on which the coccons have been built up. They remain thus till the rains set in. About the end of June or the beginning of July they are taken out and hung in a position from which leaves of

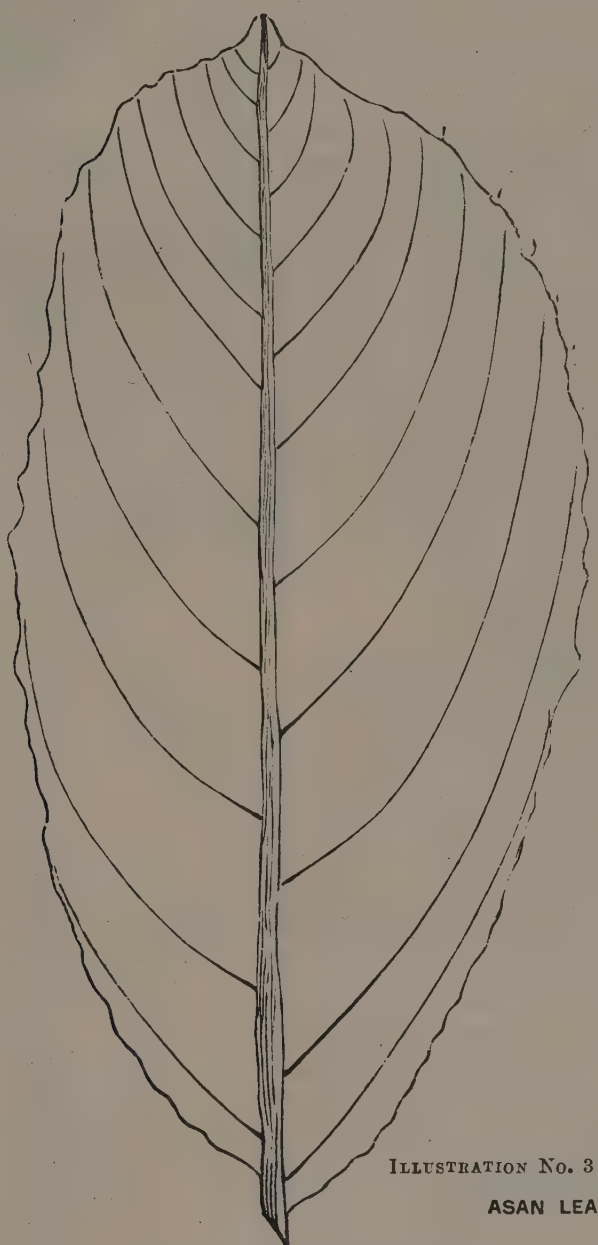


ILLUSTRATION No. 3 (SECTION 99).

ASAN LEAF.

Asan *(Terminalia tomentosa)* or Kakor *(Zizyphus xyloppyra)* trees are easily accessible. After a short time a moist spot is observed towards the upper end of

the cocoon. This indicates that the moth within is preparing, by means of the solvents which nature enables her to secrete for the purpose, to break the shell and emerge into the light of day. The moths are of a beautiful russet colour. Their wings are edged with a greenish-gray line in front and a red and white band behind, and on each wing is a spot about the size of a big pea, in the centre of which is a transparent membrane similar to beetle's wings. The length of the body of the moth is a little less than two inches, while the breadth from tip to tip of its wings when fully extended is over six inches. The female moth remains on the empty cocoon while the male flies about. The usual time for emerging from the cocoon is about nine o'clock at night.

KAKOR LEAF.

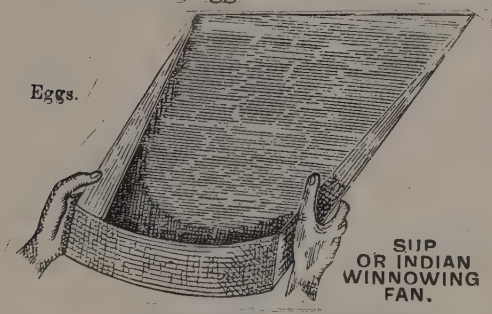
Illustration No. 4 (Section 99).

100. The moths enjoy their winged existence for a brief day. In the afternoon the rearers prepare a sort of *chauka* or ground plastered with cowdung, and place the fertilized females on it, where they begin to lay their eggs soon after dark. Two and two of these are tied together to prevent escape. About 100 to 150 is the number of eggs expected from each layer. Sometimes the egg-laying is assisted by pressing the moth with the hands, and when no more eggs are forthcoming the moths are thrown away.

Moths.

101. The eggs are collected in an earthen pot. Next morning the heavy ones are picked out from the light ones either by means of a winnowing fan, *súp* (see illustration) or by throwing them all into cold water when the light ones float on the surface.

Eggs.



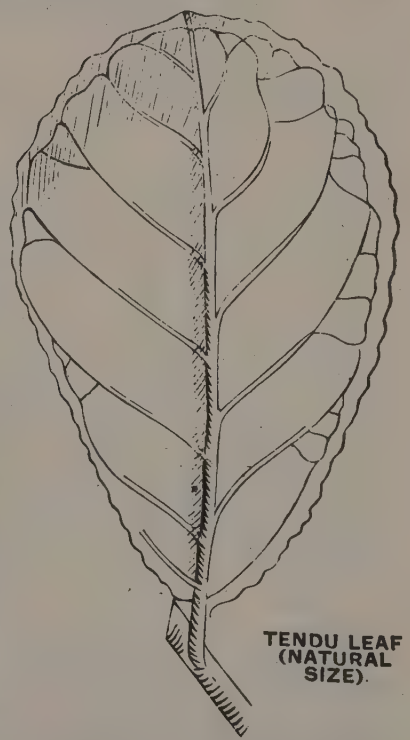
SUP OR INDIAN WINNOWING FAN.

Illustration No. 5 (Section 101).

102. The selected eggs are tied loosely in pieces of cloth and placed in a *nánd* (earthen jar) for about a week. The mouth of the *nánd* is covered with a piece of cloth tied lightly round it. After eight days the *nánd* is opened and small worms about one-tenth of an inch long are seen to have been hatched out of the eggs

103. These worms are then placed in a *dona* of tendu leaves (Diosphyros glutinosa) and hung up from an ásan or kákor tree. The *dona* is a hollow made up of two leaves stitched together and kept stretched by means of small twig inserted within. The worms get out of these artificial shelters and begin to devour the leaves. They spread themselves on the branches of the trees. As these branches become more and more denuded on account of the voracious appetite of the worms, they

Second cycle.



TENDU LEAF (NATURAL SIZE).

Illustration No. 6 (Section 103).

are cut off with the worms on them and attached to other trees which are in full leaf. This process goes on for severals weeks, until the worms are matured.

104. September is about the time when the Tasar worms attain full maturity, and begin to spin their cocoons. The shelters are now useful for this work. The worm seeks a convenient nest in which to rest and quietly build up its cocoon, which contains silken fibres inside and is covered on the outside with a hard shell which protects the chrysalis until it grows into a moth. The cocoons are ready in about three days.

Tasar cocoons.

105. The September (Bhádon) cocoons are very light, and their shell is not so hard as the November (Kártik) cocoons of the second crop. The reason is that the September cocoons have not to protect the insect from such severe conditions of weather as the November cocoons. The September chrysalis soon emerges as a moth and lays its eggs, from which the worm hatches out, grows to maturity, and builds the cocoon of the second generation by the month of November. It is the cocoons of this November crop which go to market, a few being still retained and hung up in the forest for the perpetuation of the species next year. They lie exposed to the chills of winter and the hot sun of March and April, for the chrysalis sleeps till the break of the rains in the succeeding July,* and their shells are consequently of a very strong and substantial build.

106. The September cocoon without the insect weighs about 16 grains, and the November cocoon about 26 grains. From every hundred pounds of cocoons about 14lbs. 6oz. of raw tasar is obtained, having a length of 2,082,500 yards. The selling price of raw Tasar was this year Rs. 3-8-0 per pound at Benares.

* So the District Report from Mirzapur. It is more probable that the insect has more than two cycles in the year; but only two cycles, of July to September and September to November, are noticed; while the others, not being under observation, are not known to the collecting tribes.

CHAPTER III.

Silk Threads.

107. The processes of sericulture have been described to the point at which the cocoon is ready for the extraction of silk. The next step is to kill the worm in those cocoons which are not reserved for seed, and then to reel off the silk fibre. In Europe there is generally a steaming apparatus provided for the purpose. In these provinces the much more primitive method of boiling them slowly in water is practised. The *nánd* or earthen pot in which they are boiled is placed over a lighted oven, and a slow fire is kept up. The boiling also serves the purpose of dissolving the resinous elements and separating the filaments. The Bengal method of exposing the cocoons to the heat of the sun is not so good, but is occasionally practised.

Killing the worm.

108. No bell receiver or other arrangement for keeping up a uniform measure of heat by the thermometer is in use in this process even on the Lister Grant. It is true that the Lister Grant contains some of the latest apparatus for the purpose; but the reeling process having been in abeyance for some years, the apparatus has not been brought again into use. There is a chamber connected with a boiler, but the lighting up of the boiler for the supply of steam would be too expensive for the very small quantity reeled at present, and the manager has built another chamber where a furnace will heat a pan of water for the choking of the live insects in the cocoon.

No apparatus.

Except on the Lister Grant.

109. The insect having been killed or choked, the process of reeling commences. The thread now opens easily, but the reeler has to find the end with which to begin. Having found it, she (it is generally a woman) combines filaments from a number of cocoons, one from each. The number varies according to the fineness or thickness of the thread desired. It is generally eight. All these filaments having been run together, the thread is drawn simultaneously with a dexterous jerk of the hand and run on to a sort of hook attached to a stick standing upright from the ground. The different filaments coming straight from the cocoons are properly combined at this first hook. Side by side with it is another similar set of an equal number of filaments which combine at another hook at an equal distance with the first hook from the *nánd* containing the cocoons. Thus two threads are obtained, one at each hook. These two again are combined into one at a third hook further away from the *nánd*, and the single common thread so produced is then passed on to the reel of the reeling machine known as the *charkhi*. The hooks are technically known as guides. It will have been seen that the thread now obtained consists of 16 filaments in two sets of eight each, which

Reeling

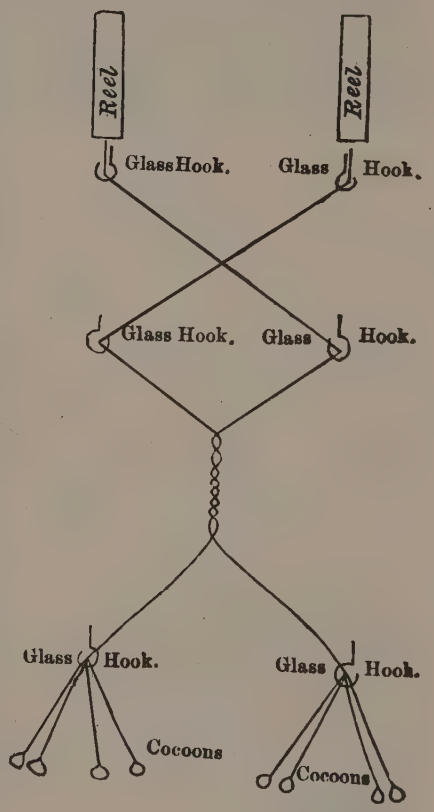


Diagram No. 7 (Section 109).

Illustrating the process of reeling on the Partábgarh Estate.

are combined at the combination "guide" or hooks. If a thicker thread is desired, the number of combination "guides" or hooks is increased.

Care and judgment required.

110. In good reeling, particular care is necessary to see that minute *knibs* or particles of cocoon skins do not spoil the evenness of the thread, and that, as delivered at the reels, the thread is perfectly round and of uniform thickness. In its soft condition it is liable to assume a flat shape and a certain amount of roughness in passing through the hooks. Also, as the cocoon filaments are gradually unwound it is found that they become finer and finer as they approach the centre; so that supposing the reeler started with eight cocoons when the outer filaments were being unwound and reeled, she would gradually increase the number of cocoons in each set to 9 and 10, or more, as required, in order to preserve the same thickness on the reel throughout. This requires great experience and judgment and a quick eye in the reeler, not to be acquired except after years of experience.

Croissage.

111. These *minutiæ* are not, however, observed in Indian reeling, and the results are necessarily inferior. On the Lister Grant, the device known as "Croissage" is, however, adopted. In fact there is no reason why in course of time the complete French system of

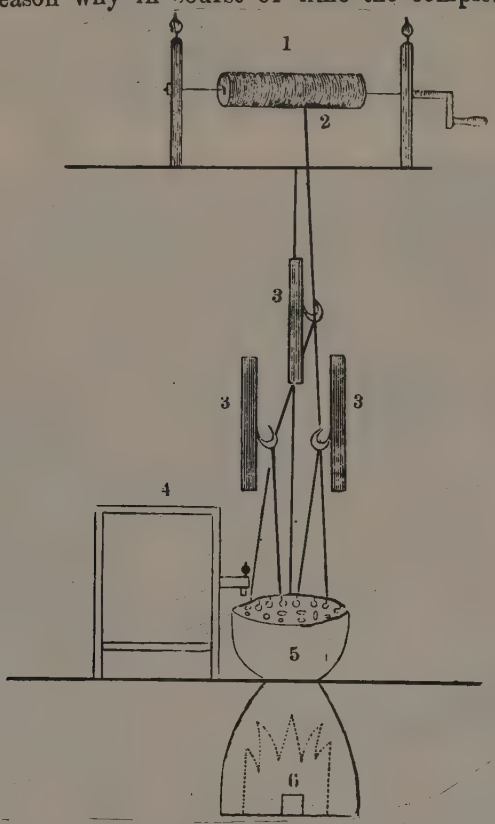


DIAGRAM No. 8 (SECTION 111).
TO ILLUSTRATE CROISSAGE.

reeling should not be introduced there under expert European guidance. The object of "Croissage" is to remove the flatness produced by the hooks and restore the natural roundness of the thread. Shortly explained, it simply means that for a short space the threads of two reels before they reach the reel cross each other in a twist like the strands of a rope, then diverge again, and by means of separate hooks are delivered at separate reels. The system of croissage will be best understood

by diagram No. 8, and the whole system of reeling as practised on the Partábgarh Estate, by diagram No. 7.

112. The *charkhi* which contains the reel will now be described. There are two wooden uprights with a hole in each at about two-thirds of its height from the ground. In these holes runs a cross-bar which carries the reel. The reel rotates along with the cross-bar when the latter is moved by the revolution of the handle attached to it on the other side of the upright. The handle is worked by hand. The reel is a simple structure consisting of two small wooden wheels joined by a number of thin strips of bamboo, which thus lie parallel to the cross-bar. The thread is wound round these strips. The reel is removable from the cross-bar.

Charkhi.

113. From the reel the thread has to be transferred to a *natáwa* (ناتوا) which is a bamboo frame with a central axis, as shown in the illustration. The *natáwa* frame presents a series of four or eight planes enclosing a nearly cylindrical space (not a true cylinder because, besides not being round, it is slightly narrower in the centre than at the upper and lower ends round which the thread is wound. In this way the whole thread takes the shape of a hank or skein, when it is transferred to an instrument called the *paraitá (paratia* in Mirzapur). If the thread is required to be doubled, the threads from two *paraitás* are taken together and laid on to a third *paraitá*.

Natáwa.

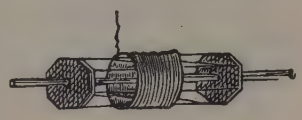


ILLUSTRATION No. 9 (SECTION 113).
NATAWA.

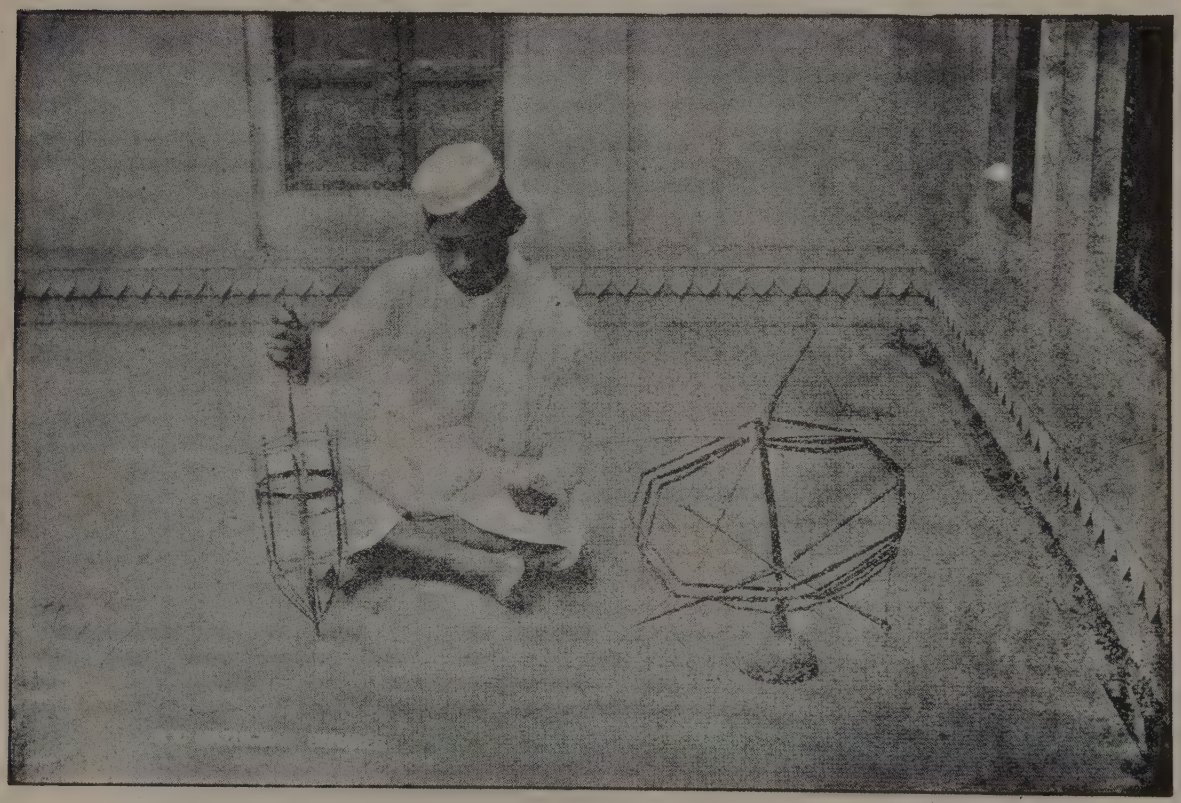


ILLUSTRATION No. 10 (SECTION 113).

The workman is unwinding the *kachcha* thread (which he holds in his left hand) from the *natáwa* to the *paraitá*, which he turns with his right hand.

114. The *paraitá* requires a brief description. It consists of a central bar which forms the axis, round the upper end of which is a framework of bamboo sticks sloping upwards and forming either a cone with a circular base or the frustrum of such a cone. The cone rotates with the rotation of the axis. The hank having been fixed on the cone, the lower end of the axis is fixed in a lump of clay on the ground, in such a way, however, as to allow a free motion of the axis when the *paraitá* rotates on account of the impetus imparted by the unwinding of the thread. This axis is not fixed upright, but at a slight angle to the perpendicular.

Paraitá.

115. The thread now undergoes a different treatment according as it is intended for the warp or the weft. The weft thread is not required to be of the same strength as the warp thread, and it is not twisted at this stage. The minimum of twisting consistent with strength

Weft threads.

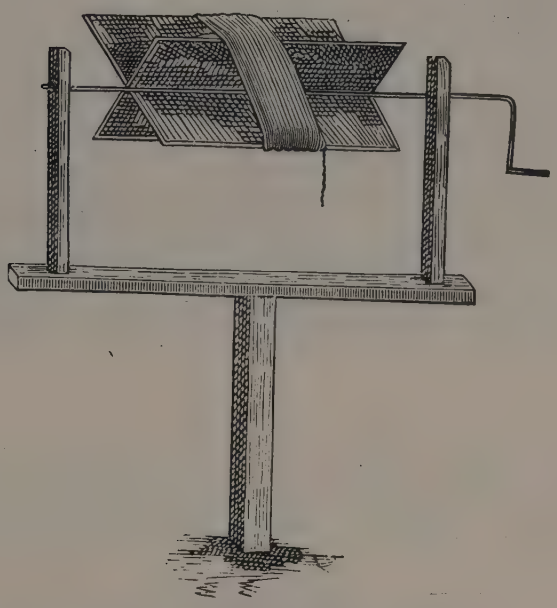


ILLUSTRATION No. 11 (SECTION 115).

THE TAHVIL.

and finish is the rule in the case of silk fabrics, because the more the silk is twisted the more it loses in gloss and that fine softness which gives a peculiar attraction to silk fabrics. The weft threads are simply taken off the *paraitá*, bleached and dyed if necessary, and put on to an instrument called the *natai* or *tahvíl*, of which the rotating portion is sometimes, not always, horizontal. From the *natai* the thread is, by means of the *charkha* wheel, to be presently described, transferred to the little spindle *(toti, donti* or *nári)* which is ultimately destined for the hollow of the little boat-like shuttle *(nár)* which works the weft *(báná)*.

116. So far the weft threads. The warp threads have to be twisted before they are transferred to the spindle of the *charkha*, and this process on the spindle is not the last stage in their evolution as threads. From the *paraitá* the thread is passed through a series of brass

Warp threads.

ILLUSTRATION No. 12 (SECTION 115 .

The weaver is here unwinding the thread from the *paraitá* on to the little wooden spindle attached to the weft thread *charkha* while he turns the *charkha* wheel with his right hand. It is often unwound from the *natai*, seen beside the *charkha* wheel—the *natai* being the instrument to which the thread is transferred in the bleaching or dyeing process. This *charkha* is only for weft threads, not for warp threads.

rings, so arranged that in passing through them on its way to the spindle the thread receives a sufficient amount of twist. Any particles of shell or knib adhering to the thread are also knocked off at this stage. The wheel of the *charkha* is of exactly the same shape as the ordinary Indian spinning wheel. Its axle is supported on holes made in a pair of uprights resting on the ground. The tyre is indented with a groove which holds in position an endless string (called *mál)* connected with a spindle. The axle of the wheel is about two feet from the ground; and at a distance of about two feet from the wheel and about midway between the *paraitá* and the wheel are two horizontal bars also supported on uprights, carrying the spindle in a vertical position. When the handle of the wheel is worked with the hand, the wheel revolves rapidly, the endless string makes the spindle revolve similarly but with a still more rapid motion, and as the end of the thread from the *paraitá* after passing through the brass rings is already attached to the spindle, the *paraitá* also revolves, unwinds, and gives up its thread. On the other hand the spindle is gradually covered with twisted thread. When full, the spindle is taken off and the thread is ready for dyeing or weaving. Diagram No. 13 illustrates the *paraitá* and *charkha* and the process of twisting.

Twisting.

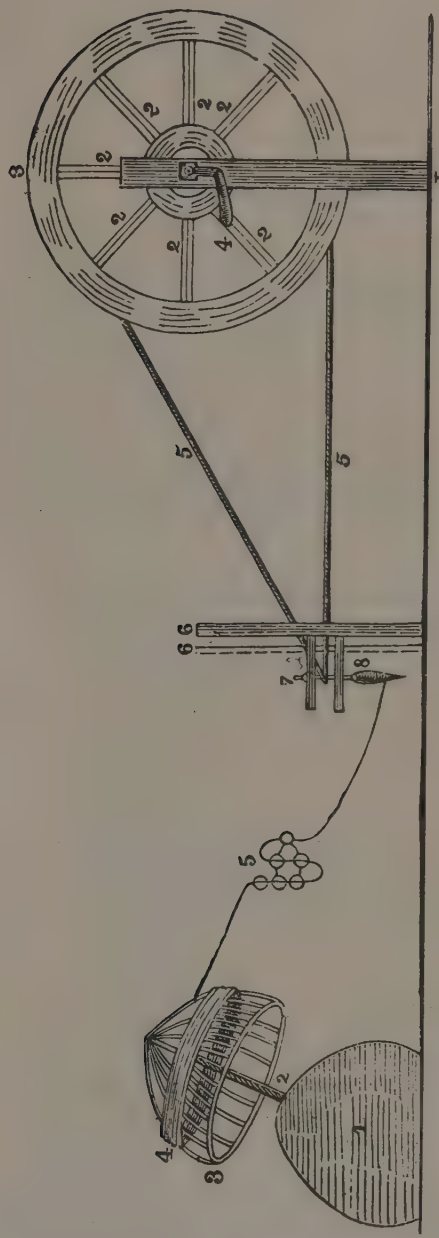


ILLUSTRATION No. 13 (SECTION 116).

117. The process of reeling is often interrupted by the breaking of the filaments as they come out of the cocoons. The better the cocoons, the more continuous are the fibres and the fewer the interruptions. Each time a filament snaps, the reeler has to stop and join the disconnected ends before she can proceed.

118. A useful little machine known as the *khâli* (خالی) merits a brief description. It is simply a frame-work of bamboos round a central axis, to which at short intervals two or three cross sticks are tied whose ends carry four or six vertical rods, all parallel to the central axis. These rods form the frame-work on which the thread is wound or from which it is unwound. Diagram No. 14 illustrates the arrangement of the rods.

Khâli.

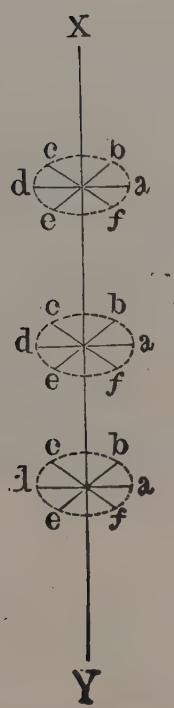


ILLUSTRATION No. 14 (SECTION 118).
DIAGRAM,* EXPLAINING THE KHALI.

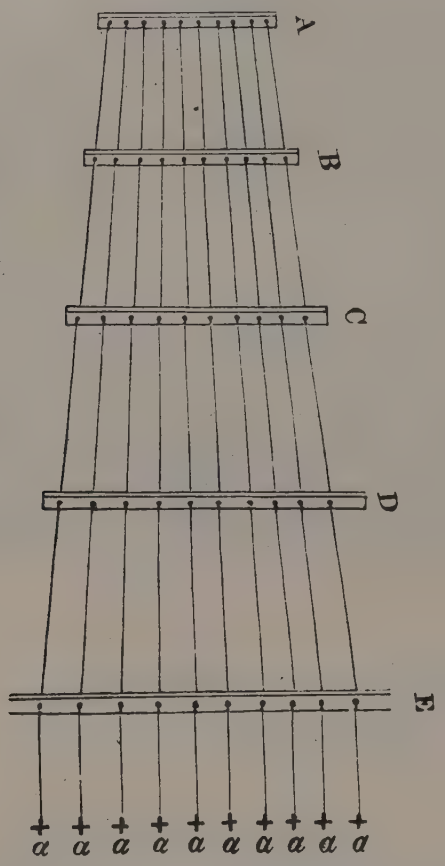


DIAGRAM No. 15 (SECTION 119).
THE TAG, FOR TWISTING WARP THREADS.

* xy is the central axis ; a d, b e, and c f represent the cross sticks, while b b b, a a a, f f f, e e e, d d d, and c c c are joined by means of vertical rods on which the thread is wound. This instrument is useful for intermediate steps between two processes. For example in twisting silk thread the thread is transferred from the reel of the *charkhi* on to a *khâli* (خالی) and retransferred from the *khâli* to the *paraitá*. It might appear at first slight that this winding and unwinding as an intermediate step is a superfluous waste of energy ; but it must be remembered that the different processes of twisting a thread on itself, or of throwing and doubling, frequently require a change of thread from one instrument to another which cannot be carried out without the intervention of the *khâli*. Besides, owing to defective reeling, Indian and Central Asian skeins of raw silk contain thread of very uneven thickness, and it is necessary to separate each skein into two or three skeins of thread, the first quality being reserved for warp, the intermediate qualities being used for general purposes, and the last quality being usually disposed of to *patwás* as unfit for weaving and only useful for miscellaneous work. In this sorting process also the *khâli* is serviceable.

Tág and *Dhuks.*

119. In section 116 we showed a method of twisting silk in its passage from the *paraitá* to the *charkha*. Besides this process, which only gives a slight twist, another is applied to warp threads by means of an apparatus called the *tág*. The threads as taken out after reeling are wound round a *kháli*, from which they are again unwound, and attached each to a ring connected with a rod A (see diagram No. 15) about three feet long and supported by a pair of legs at a height of about three feet from the ground. When each ring has been threaded in this manner the threads are extended to a distance of about 40 yards. At short intervals from the rod A are similar rods B, C, D, E, which carry the same number of rings as A through which again the thread is passed. The loose ends of the threads are allowed to hang down from the last

ILLUSTRATION No. 16 (SECTION 119).

The thread is being transferred from the *paraitá* on to the *sardukhs* of the *tág*, by means of which it is twisted. From this it will be transferred to the warp thread *charkha*, which the workman is holding in his right hand.

rod of the series to about a foot from the ground. Each thread is weighted at this end with a small stick about six inches long carrying a clay dummy about two tolas in weight. These small weights are called *dhuks* (دھک) (*sardhuks* in Benares) and are shown in the diagram as *a a a*. The weights are now given a smart spin with the fingers and palm of the hands, and they send the thread twisting throughout its length, until the impetus is exhausted, when the spinning motion is repeated. When a sufficient amount of twists has thus been given, each thread is again wound on a *khâli* (کھالی) and held ready for the next process, which may be either dyeing or weaving.

120. Instead of the *dhuk*, a spindle-weight called the *phirki*, is used in Agra, where the rings are of glass. Glass is superior as a material for the rings used in the silk industry, because of the smoother surface it offers to the silk threads and the exceedingly small amount to which friction by contact may be reduced when glass of the proper quality is used. The twister is called *todi* (توڑی) and the whole of the simple tools used in "throwing" as practised in these provinces can easily be obtained for the matter of a rupee or so.

121. All this applies to the reeling of the silk of the mulberry-feeding insects. *Eri* silk is not reeled, as its fibres are too disconnected and uneven to yield readily to this process. *Eri* silk is spun and treated like cotton. The cocoons are first boiled for two hours in an alcoholic solution containing either *sajji* (native carbonate of soda) or ashes of plantain leaves or of indigo plants. This renders the fibres soft and pliable and ready to be spun.

Eri silk not reeled,

122. *Eri* silk is spun with the usual Indian spinning wheel. This wheel, too, is called the *charkha*, and consists of a double set of wheels united by a series of twisted cotton threads passing from one wheel to another diagonally. The spinner takes a quantity of the silk fibres in her hand, deftly spins out of the mass a piece of thread between her fingers and attaches it to the spindle in the wheel. Resting the wheel against her toes, she patiently sits for hours on the ground, moving the handle of the spinning wheel and thus giving a rapid motion to the spindle, which gradually fills with spun yarn.

but spun

123. The yarn thus produced is coarse. It is twisted by means of a simple instrument called the *tákur*, or *batni*. This consists of a big needle about the size of that used for sewing leather, the lower end of which carries a wooden ball. The needle with the ball is suspended from above, free in the air. The point of the needle is at its upper end and just below it is a small notch like that of the leather needle. The thread is attached at a point near the ball; two or three turns are given round the needle and then it is made fast in the notch. About three feet of thread is let out above the needle. The twister quickly rolls the needle between his fingers and his left thigh, which sets the ball rotating rapidly until the impulse is exhausted, when the process is repeated. After two or three repetitions the yarn let out is found to be sufficiently twisted. It is then wound round the needle and the end of the twisted portion is made fast again at the notch. More thread is now let out above, and this goes on until all the thread has been twisted.

and twisted with *tákur*.

124. No waste occurs in *eri* silk; being spun, the whole of its fibre is utilized. In the case of mulberry-feeding silkworms, after the glossy portion of silk has been reeled off, there is still left in the cocoon a small quantity of fluffy fibre which cannot be reeled, and which is called waste silk or *chashm*. This is mixed with some pea-flour *(matar-ka-áta)* and boiled, thus dissolving any mucilaginous matter that there may be in it and rendering the substance soft and pliable. After being dried, this *chashm* of bombycide silks is spun and twisted in the same manner as *eri* silk.

No waste.

Waste of mulberry silk.

125. The method of dealing with the tasar cocoons in Mirzapur is somewhat different. In an earthen pot about two sérs of *reh* (saline efflorescence of earth) or *sajji* (carbonate of soda) are dissolved with four sérs of cold water. The pot has a hole at the bottom which is stopped by a piece of twisted cloth loosely put in. There is another pot underneath, into which the solution trickles down. A pound of this solution is mixed with 20lbs. (10 sérs) of water, and about 300 cocoons are put in it and boiled for about six hours. A flat stone is placed on the cocoons to prevent them from floating up to the surface and flowing out of the pot with the ebullition of the water. This process both kills the insect within the cocoons and at the same time dissolves the mucilage in which the fibres of the tasar are embedded.

Treatment of tasar cocoons.

126 The cocoons are now fit for reeling, and the reeler in Mirzapur district is always a woman. She sits on the ground, with a stone bowl about seven inches in diameter and three inches in depth to her left (see illustration). This bowl is filled with ashes in which four or eight cocoons (*cho-koya* or *ath-koya*) are embedded. The ashes are kept damp with water. The cocoons having been washed with water, the outer coating of inferior silk is removed. The woman then takes out one filament from each of the cocoons, and rolls them together between her hand and her left thigh It will be noticed that here again, as in the case of bombycide silks, there are four or eight threads reeled together simultaneously. The combined thread is then carried on a *paratiá* or *paraitá*. In Mirzapur this wooden frame consists of a central stick about 20 inches long, to which are attached two cross sticks, one at the top about 3½ inches long, and the other about six inches from the top, and six inches long. The ends of the cross sticks are also joined by means of side sticks on which the thread is reeled by revolving the handle of the stick which forms the axis. The whole *paratiá* is not unlike the *latái* or frame on which boys wind the thread for flying kites. See illustration.

Reeling.

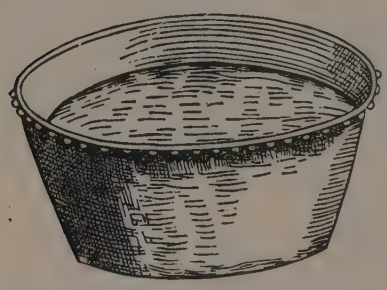


ILLUSTRATION No. 17 (SECTION 126).
THE STONE BOWL, MIRZAPUR.

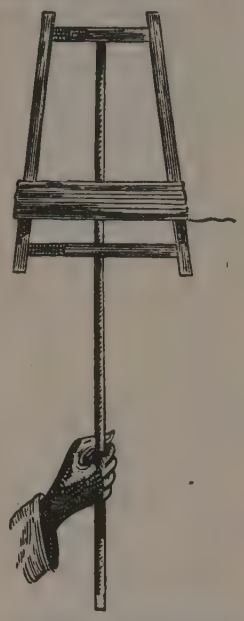


ILLUSTRATION No. 18 (SECTION 126).
PARATIA OF MIRZAPUR.

127. The thread so produced is simply called tasar thread, and may be compared to the "Thrown singles" of commerce. From this thread the Dongari Tasar is prepared, which may be compared to the organzine of silk, being both twisted and doubled. A length of 10 yards 39 times round is considered the standard length of the skein, and 101 skeins form a complete *tána* (warp). Thus one *tána* is $39 \times 10 \times 101 = 39{,}390$ yards in length, and sells for about Rs. 12.

Tasar thread.

128. The stone bowl costs about three annas, the *paratiá* about two annas, and the earthen pots a pice each. The earthen pots have frequently to be renewed, but the stone bowl may last a lifetime. The reeler gets in wages an anna per hundred cocoons. The *Tánawála* (maker of *tána*) gets five annas for a complete *tána*.

Hollow cocoon shells of tasar.

129. The hollow cocoon shells are sometimes made up into small ladles and used for taking out oil and such other substances from narrow-mouthed vessels. These ladles are made very simply. The top quarter of the cocoon shell is cut off and a little stick about 10 inches long, is pierced through, near the edge of the cup so obtained. The end of the stick on the side opposite to that on which the long handle projects is split slightly, and a narrow wedge inserted between the splits, which serves to keep the handle in position. See illustration. These ladles are only used locally in Mirzapur.

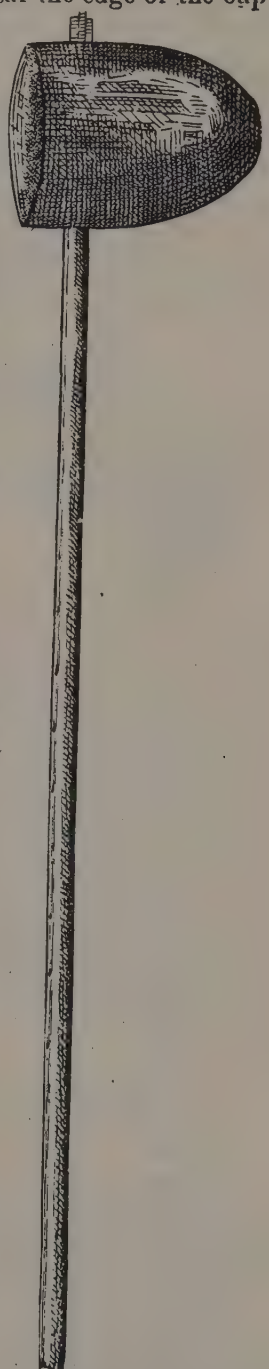


ILLUSTRATION No. 19 (SECTION 129).
LADLE MADE FROM THE HOLLOW COCOON SHELL OF THE MIRZAPUR TASAR MOTH.

Silk threads: no standard terminology.

130. Nowhere in these provinces is a standard terminology in use with regard to the quantity of raw silk, the different kinds of silk threads turned out, and the different instruments employed in the silk industry. It would be useful, however, to briefly indicate the English terminology for comparison, before passing on to mention the important local names of threads, &c., as used in different towns in these provinces. Of course there are no analogies for English machinery, which therefore might be left out of account altogether.

"Raw silk."

131. "Raw silk," then, is the silk as drawn on the reel, before it undergoes the several further processes which render it fit to be used as thread in weaving or otherwise. A skein of raw silk is the simplest form in which the product of sericulture after reeling is dealt with in commerce.

Singles.

132. A thread of silk twisted on itself, without undergoing the further processes to be mentioned hereafter, is known as "singles." Two or more of these "singles," twisted together in a direction opposite to that of the original twist of the "singles" make "dumb singles." Several of these "dumb singles" may again be twisted together, and form what is known as "Thrown singles," and the process itself of twisting at this stage is called "silk throwing," while the artisan who does the work is termed the throwster or thrower (*todi* or *bataiya* in the North-Western Provinces).

"Dumb singles."

"Thrown singles."

"Deniering."

133. The fineness of a silk thread is generally measured by the following standard. Four hundred revolutions of a standard reel are taken and weighed; the weight of this length is expressed in terms of a "Denier," which is equal to the two-hundredth part of 16½ grains, or 0825 of a grain. The weighing of a length of four hundred revolutions of the reel in terms of "deniers" is called "deniering." The formula by which the superior kinds of silks, especially thrown silks, are quoted, denotes the number of "deniers" so found, and is spoken of as the "title" of the silk. A "bale" of silk is generally about 102 to 103 lbs. in weight, equivalent to about one maund and 11 seers.

134. The two principal kinds of compound threads used in silk manufactures are "tram" and "organzine." Tram is formed by the combination of two or more single threads without twist, first merely doubled together, and afterwards slightly twisted together, with a view to the production of a more compact thread. Organzine is the combination of two or more "dumb singles" or "thrown singles," which are first simply doubled, and then retwisted on each other in an opposite direction to that of the twist of the "singles." It will be noticed that in "tram" and "organzine" there are two distinct processes, first that of "doubling" or laying together of several threads side by side and winding them in this form, and secondly, the twisting of the several "strands" in order to obtain increased strength. "Singles" are used for soft undyed, very light-textured stuffs, but ordinarily organzine is used for the warp threads and tram for weft threads of silk fabrics.

"Tram."

"Organzine."

135. The name by which the different kinds of raw silk and silk threads are known in different parts of these provinces vary; and in the absence of a standard technical vocabulary, it is not always easy to compare the names used in one town with those used in another. Nor indeed are similar articles or goods necessarily dealt with in the different places. The different centres of silk industry have their own traditions and their own methods; and in many instances the products of their labour are different not only in quality, but also in kind. A brief review of some of the local varieties of "Raws" (*i.e.* raw silks) and silk threads will now be desirable.

"Raws" and silk threads in different towns of these Provinces.

136. In Agra the several kinds of raw silk used are as follows:—

Agra.

1. Koya ... (کویا) ... ; a very fine and bright thread.
2. Sanduli ... (سندولي) or Sandal... (صندل) or Sangal... (سنگل) 3. Ghan ... (گهن) 4. Kanduri ... (کندوري) — Next to Koya in fineness and used generally in making *daryái*.

Sandal is imported from Bokhara or Central Asia and sold at from Rs. 7-8-0 to Rs. 11 per lb.

5. Phúl ... (پهول) 6. Kákari ... (کاکري) — Both are imported from China *viâ* Bombay. These varieties are of a white colour in their raw state.
7. Mukta ... (مکتا) 8. Ḍori ... (ڈوري) — These are of inferior quality and are used in the manufacture of a kind of sheet called Andia (اندیا).

The term *Mukta* is sometimes specialized for the product of pierced cocoons, and *Ḍori* is sometimes used loosely for any kind of thread, but more frequently for twisted thread (see below).

9. Tasar ... (ٹسر) — This need not be further described. See section 95 *seq.* It is imported into Agra from Midnapur, apparently not directly from Mirzapur in these provinces, although it must be remembered that some of the tasar exported to Bengal from Mirzapur finds its way back to these provinces after being reeled.

The prices of the raw silks at Agra range from Rs. 4 to Rs 8 per lb. according to the kind and quality of the articles.

137. The threads made in Agra are known by the following names:—

1. Ektára ... (اکتارہ) — Single thread formed by twisting the filaments of raw silk in order to give them strength; these may be compared to the "singles" of commerce.

2. Dotára ... (دوتارہ) { Two or more untwisted threads twisted together in one direction. These may be compared to "tram."

3. Dori ... (ڈوري) { Two or more singles or trams twisted in such a manner that the twist given to the combined threads is in an opposite direction to the twist of the single threads, thus strengthening the twist and preventing its being undone. This corresponds to organzine.

138. In the Farukhabad district silk skeins are imported from Calcutta and Bombay, and are known under the following names :—

Farukhabad.

1. Bának ... (بانک);
2. Ghungru ... (گھونگرو);
3. Phúl ... (پھول);
4. Sandúki ... (صندوقي);

The first two are received from Calcutta and the last two from Bombay Both *bának* and *ghungru* are yellow in colour, but the skeins of *bának* are larger and the threads finer than those of *ghungru*. Both are sold at Rs. 6 per pound. The *phúl* skeins are white in colour and the *sandúki* yellow, but both have finer threads than *bának* and *ghungru*, and the fabrics manufactured from them are superior in softness and brilliancy. *Phúl* and *sandúki* are also sold at Rs. 6 per pound.

139. There are four kinds of threads made in Farukhabad from different kinds of raw silk ; but as they merely differ in quality and degree of fineness, and do not go by specific names, no further description is necessary except to mention that the best two qualities are used for the warp as being the strongest; the third quality is used for the weft, and the fourth is utilized as waste silk by *patwas* and others.

140. In Lucknow, though silk fabrics are very little if at all manufactured, a great deal of silk is consumed in auxiliary industries connected with silk :—for example, *patwa's* work, *chikan*, *gota*, &c., which will be described in a separate chapter. The raw silks known are principally—

Lucknow.

1. Sangal ... { Both white and yellow imported from Central Asia through the Panjáb.

2. Bának ... { From Lower Bengal. The skeins are called *Bandis*. *Sangal* however has recently shown a tendency to supplant *bának*, specially in regard to the manufacture of lace *(gota)*.

141. The different kinds of threads in Lucknow are :—

1. Agri ... (اگري) { First quality, the thread first reeled off from the cocoon.

2. Durra .. (درا) { Second quality, the thread next reeled.

3. Tirra ... (ترا) Third quality, next reeled.

4. Chunta ... (چنتا) Fourth quality, next reeled.

5. Kachar ... (کچر) { Fifth quality, found innermost in the cocoon. The *kachar* thread is too coarse and hard to be of much practical use except in miscellaneous *patwa's* work.

142. In Benares the chief varieties of silk used are as follows:—

Benares.

1. Tandúri ... (تندوري) { Ranging in price from Rs. 12 to Rs. 17 per seer; it is imported from Maldah and other places in Lower Bengal, and makes a strong and good thread. The better qualities are used for *kamkhwáb* and *zarbaft*, while the inferior qualities make *pitambar* for *dhotis*.

The varieties of Tandúri thread known are—

(*a*) Dotána ... (دوتانه)
(*b*) Bharna Awwal, (بهرنا اول)
(*c*) Bharna ... (بهرنا)
(*d*) Narm Bharna... (نرم بهرنا)
and (*e*) Manjhola ... (منجهولا)

} (*a*) and (*b*) are of superior quality to the others.

2. *Bának*, called also *Subhani* or *Angrezi* (English), also known locally as *Lambi laṭhi* (having a long hank). Its price varies from Rs. 10 to Rs. 20 a seer. It is thinner and finer than the Tandúri varieties. The Panjábis use it for their *sáfás* or turbans. It is also used for *rumáls* (handkerchiefs), and in *gulbadan* work and occasionally for *dupattas*. It is a great favourite for silk borders *(kináris)*.

3. *Mukta* or *súta*. This is a coarse but enduring class of silk, and is used most frequently for inferior kinds of *kamkhwábs*. As a rule the silk used for *kamkhwábs* is coarser than other silks, because a thin fine silk would not admit of heavy gold patterns being worked on to them. The price of *mukta* is between Rs. 3 and Rs. 6 a seer. Being drawn chiefly from pierced cocoons it is often spun and treated like cotton.

4. Sangal or Sandal from Central Asia. This has already been described under Lucknow. Four varieties are known in Benares, *viz.*:—

(*a*) Bardán ... (بردان) ... Used for fabrics of light texture.
(*b*) Nawábi ... (نوابي) ... Thicker than the Bardán.
(*c*) Bashíri ... (بشيري) ... Next in degree of thickness.
(*d*) Kokáni ... (كوكاني) ... { Generally used as the last thread in a border; is thicker than the other kinds.

5. Ghungru .. (گهونگرو) ... { Very largely used in Benares in making silk fabrics; can produce finer kinds than most other kinds of silk.

143. The threads used in Benares may, besides the classification indicated under Tandúri, be classified as follows, and the classification applies peculiarly to Ghungru.

(*a*) Chiniá ... (چنيان) ... { A twisted thread usually composed of four to 12 strands. It is generally used for warp threads of flowered or broché fabrics. This is a special thread and employs the services of a special class of thread-makers called *naqqád*, who also make Pát thread.

(*b*) Katán ... (كتّان) ... { Generally consisting of two threads lightly twisted together and used for the warp of such light fabrics as *mashru*, *sangi*, *gulbadan*, etc.

(*c*) Pát ... (پاٹ) ... { Consisting of two to 12 threads doubled together, but not twisted, and used for the weft of such thick fabrics as satin, etc.

144. In Azamgarh district the silk threads known are—

Azamgarh.

1. Tandúri ... (تندوري) ... A coarse thread.
2. Phalla ... (پهلا) ... Finer than the *Tanduri.*
3. Guchchhi ... (گچهي)
   Or qilchi ... (قلچي)

Strictly speaking the *guchchhi* is only a small skein of silk thread, whether of the *Tandúri* or *Phalla* kind, intended to be forwarded with samples to European or other firms. Where there is an excess of *guchchhis* in stock, they are disposed of through the various local *áṛhats* (agencies), and used up like the other kinds of silk thread.

Both *tandúri* and *phalla*, and the *guchchhi* form of each of them, have two varieties, (1) the mota (موٹا) or coarse and (2) the *mahín* (مهين) or fine variety.

These threads are imported chiefly from Calcutta and the town of Beldanga in Murshidabad district. The price of *phalla* thread varies from Rs. 17-8-0 to Rs. 18-8-0 a seer for the fine variety and Rs. 10 to Rs. 15 for the coarse variety. The price of tandúri varies from Rs. 10 to Rs. 15 per seer. The skeins are called *laṛis* (لڑي) or sometimes loosely *phallas.*

Tasar thread is imported into Azamgarh from Bengal districts and from Ahraura through Benares.

Aligarh.

145. In Aligarh both raw silk (*kachcha resham*) and silk threads (twisted) are imported from Delhi and Agra. Twisted silk threads are used mostly for stringing articles of jewellery (gold, silver or articles of the baser metals), and for silk-embroidered caps and *dopattas.* Raw silk is used for making *ghundis* (native buttons of silk thread), and in a variety of silk needle-work. Raw silk of violet (*baijni*) colour is mostly used by *Náichabands* (persons who make *huqqa* snakes) for winding round the long tubes through which *huqqas* are smoked.

Muttra.

146. In Muttra district two varieties of silk are used. The only industries there are those which consist in making embroidered caps (crewel work) and in entwining ropes with silk for swings used in the *Sáwan* celebrations. Both varieties of Muttra silk are imported from Agra and are apparently not known by any specific names. The superior variety costs about Rs. 12 per pound and is used in embroidering velvet caps. The inferior quality sells for Rs. 11 per pound and is used in embroidering muslin, net fabrics, and velvet, and also for entwining the ropes for the *Sáwan* festival, especially in Bindrában (Hindol or Jhúl-Játra, Sáwan Sudi 3).

Meerut.

147. In the Meerut district the following varieties of silk are used and are principally brought from Delhi. The articles made are principally Meerut embroidered caps, similar to those used in Muttra. The kinds of thread are—

1. Maktul ... (مکاول) ... a fine silk thread used for sewing *gota* or gold and silver lace on to dresses (unbleached).
2. Khiáta ... (خياطه) ... a fine silk thread used for sewing silk fabrics.
3. Nakli ... (نقلي) ... a silk thread used for sewing *gota* on to dresses.
4. Kachche-Resham-ki-ḍori (Raw silk thread). ... used for *náichas (huqqa* snakes) and caps.

The price varies from Rs. 20 to Rs. 24 per seer.

148. In the Jalaun district raw silk and silk thread are obtained from Cawnpore. The price of raw silk is about Rs. 3 to Rs. 5 per sér (showing what inferior silk is used), that of fine thread about Rs. 24 a sér, and that of coarse thread Rs. 10 per seer. The raw silk is known as Jatwán (جتوان) elsewhere called Jatám (جتام) , and the thread is simply known as Ḍora (ڈورا).

Jalaun.

149. In the Jhánsi district raw silk is imported from Benares, and called Gona (گونا), Goniya (گونیان) , or Kaliya (کلیا). The reeling is done by means of the Phallar (پھلر) which corresponds to the *charkhi* described above, and the Asári (اساری), corresponding to the twisting machine *batni* or *tákur* described above. The silk is principally used to ornament the ends of *sáfás* (turbans), *sáris*, *dhotis*, and *lhengas*, more particularly the last. The ornamentation consists of a parti-coloured border varying in depth from two to eight inches. Coloured silk threads are run across in the weft, the warp being of cotton. The weaving is done by the caste known as Kushtás who reside at Orchha-Darwáza in Jhánsi city. The stringing of jewellery and other miscellaneous work is done by Patwas, who are found throughout the district.

Jhánsi.

150. In the Allahabad district the industry is similar to that in Jhánsi, and is connected mainly with the ornamentation of *huqqas* by *Náichabands*, and with miscellaneous *patwa* work. The raw *jatám* is obtained from Benares, though the sources of the Benares supply itself are, as has already been stated, Bengal and other places outside these provinces. Fairly good *jatám* can be obtained for Rs. 4 a sér. It is first boiled with *sajji* (carbonate of soda), kneaded or pounded, and spun into thread like cotton.

Allahabad.

151. Cawnpore city does not boast of a local silk industry itself, but acts as a distributing centre for several places in these provinces. In this character it is coming more and more to the front and is a serious rival to Benares, which formerly used to be not only the chief manufacturing city, but also the chief distributing mart in connection with raw silk and silk threads.

152. In Hamírpur district a small quantity of thread is imported annually specially towards Ráth town. The waste silk is known as Fuzla (فضلہ) or Khúdar (کھودر) or Pat (پاٹ), and (being waste) is sold very cheap, about Re. 1-8-0 or Rs. 2 per sér. Jatám is perhaps of slightly superior quality. The twisted threads of ordinary silk *(bati-hua dori)* sell from Rs. 16 to 20 per sér. The use is principally confined to Patwas' work.

Hamírpur.

153. The hanks or skeins are known by different names in these provinces, *e.g. bandi*, *lachchhi*, *phenti*, *katehra*, and *lari*. The term *bandi* is usually applied to skeins of raw silk, especially of *sangal* silk, before they are sorted out into smaller skeins of even thickness to be used for different purposes ; they are generally large and may weigh as much as one-eighth of a sér The small skeins after having passed through the hands of *asáriyas* or twisters are often called *lachhchis*. These may be ¼ to ½ tola in weight. The skeins in the shape of an 8 used in *chikan* work are often called *phentis*, and weigh about two tolas each. *Katehra* and *lari* are terms employed in Azamgarh district. But it must be remembered that *all* these terms denote a skein or hank, and are sometimes used indiscriminately. Until the artisans of different districts communicate with each other and learn the value of comparison as a potent factor in industrial progress, by means of exhibitions or otherwise, they will be content with a loose terminology, which conveys definite ideas to one *kárkhána* or set of *kárkhánas*, and no more.

Different names for hanks or skeins.

CHAPTER IV.

Processes to the production of the Silk Fabric.

154. The silk thread in its native state has a gum-like substance of a yellowish colour in its composition, which is removed by boiling the silk several times in a solution of *sajji* (carbonate of soda) or hard country-made soap or *arítha* (soap-nuts) for some two or three hours, while it is rubbed between the palms of the hand the whole time. When it becomes soft and bright, it is steeped and washed two or three times in tepid water. The proportion lost in weight by the process is as much as 5 to 16. This operation is called *Nikhár* or *Khárná* (cleaning or bleaching). In large cities like Benares and Agra there is special class of bleachers called *Laherás*, who also do the dyeing, but the work is frequently done by the weavers themselves. The wages for bleaching are about one rupee per sér. The threads known as *Chiniá*, *Pát*, and *Katán* are always bleached. If it is intended to produce pure white thread for use undyed, the silk is further subjected to the action of fumes of sulphur. Under this process ordinary silk parts with all natural colouring matter.

Bleaching.

155. The Laherás have another method of bleaching. They take a little pot of cold water and put *reh* (saline efflorescence of earth, or fossil alkali) and lime into it. Then they pierce a tiny hole in the bottom of the earthenware pot and let the water slowly filter out into another jar. When they start their washing they put the silk into warm water and add to it, instead of *arítha* (soap-nut) and country soap which the weavers use, some of the lime-and-reh filtered water. They say it fulfils the functions of soap and gives better results.

156. If the fabric is to be undyed the thread is now ready for weaving. If, however, it is intended to dye silk, the dying is done at this stage. Silk fabrics are rarely dyed after they are woven. An important exception occurs in the case of the white *Ghalta* pieces of Azamgarh which are dyed after being woven.

Dyeing.

157. The question of dyes has been already fully treated of in Saiyid Muhammad Hádi's "Monograph on Dyes and Dyeing in the North-Western Provinces and Oudh." It will be convenient, however, to give here a rapid sketch of such information as is available in regard to dyeing as it affects silk fabrics.

158. The question of dyeing *Tasar* has been brought into prominence on several occasions in the past, and might fittingly occupy our attention here for a short while.

Tasar dyeing.

159. Raw Tasar is of a peculiar drab colour and does not easily take dyes. It is not, however, ordinarily dyed in the Mirzapur district, where it is produced. I doubt if it is dyed in Azamgarh or Benares, though the dyers of the latter place claim to be able to dye it in brilliant colours. It is said that it is bleached and dyed in Lower Bengal. Undyed, it is the most lustrous of all silks. Mr. Wardle in his "Handbook to the Wild Silks of India" points out that the European method of reeling enables the Tasar to dye more easily and to take a greater variety of shades including the lighter ones than would be possible with the rough-and-ready methods of reeling practised in India. The aniline dyes, under certain conditions, it takes moderately well; but they are fugitive. He mentions, however, that binoxide of barium sufficiently bleaches the fibre to admit of its taking lighter dyes; but this process is expensive and difficult to carry out. Sulphurous acid, which bleaches ordinary silk, is not found to be effective with

Tasar. He gives the following list of Indian dyes as those best adapted for tasar :—

CLASS I.

Rich colours.

Lac.
Safflower.
Leaves of Phyllanthus Emblica or Âonla (आँवला).
Calyces of Thespesia populnea.
Flowers of Butea frondosa.
Indigo.
Harsinghár flowers (especially good).
Flowers of Cedrela toona (very good).

CLASS II.

Colour not so brilliant.

Manjeet (root of Rubia munjista).
Cotton flowers.
Sapan wood.
Flowers of Garislea tomentosa (vernacular name *Dha*).
Root of Morinda citrifolia.
Ashna bark (otherwise Ásan, Terminalia tomentosa).
Root bark of Ventilago Maderaspatana.

CLASS III.

Colour poor, but adapted to Tasar.

Seeds of Cassia tora.
Pista phúl.
Bark of Euphorbia tirucalli.
Pomegranate rind *(Náspál)*.

Dyeing ordinary silks.

160. As regards ordinary silks, the dyes used nowadays are in most instances fugitive. The old art of dyeing from indigenous vegetable dyes, some of them of great beauty and permanence, has been almost abandoned with the influx of the aniline dye powders which now flood the market. The new process (with the aniline dyes) lends itself to a larger variety of colours; the colours produced are more brilliant to start with; they are cheaper and easier to use; and they take less time in dyeing. They can never, however, entirely supersede the older methods, which if they were slower and more expensive, produced fast colours that lasted more than a generation or two and practically were after the wear of years quite as beautiful as when they were put on. They were also better adapted to oriental artistic taste which, in the matter of detecting subtle harmonies of colour, has an instinctive character that has been frequently recognised.

Aniline dyes.

161. The method of dyeing is simple, but slow. After bleaching and washing they put their dye into a little stone vessel called *kharal* (mortar) and pound it up fine, exactly as an apothecary does with his mortar and pestle. Then they add some water and continue the pounding. Finally, they pour the whole mixture into another pot and add some more water. Meanwhile the silk has been steeping in cold water. They now put a little of the dye mixture into the vessel holding the silk and keep rubbing it into the silk with the hand. They keep on adding the dye little by little, always pressing the silk up and down and rubbing it between the hands. In that way it takes between one and three days before the silk is properly dyed.

162. The thread thus dyed is then put out to dry. Where exceptional cleanliness is desired, a framework like a gallows is used for this purpose. A strong wooden post is fixed to the ground, carrying near the top a horizontal bar firmly attached to the post. The skein of silk is then hung up from this rod. A small stick is passed through the skein at its lower end, and this is twisted by a workman in such a manner that all the moisture is wrung out and the thread is dry and ready for use in a short time (see diagram).

Drying.

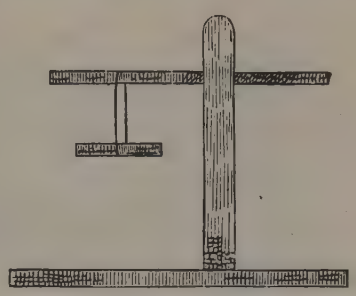


ILLUSTRATION No. 20 (SECTION 162).
DRYING-POST.

163. In producing fast colours it is necessary to employ some chemical agent which has a bond of union with the substance intended to be dyed as well as the dye intended to be applied. It is only by the help of such agents that permanent colours can be produced. When true chemical action has not taken place the superimposed colour would come off at the slightest exposure to heat or moisture. The agents employed in fixing the colours are called mordants *(zámin* ضامن). Sometimes the mordant itself has its own colour or at least, owing to the chemical action set up, it vitally affects the original colour of the dye-stuff. Thus a variety of colours and shades is capable of being produced by simply varying the mordants.

Mordants.

164. *Common alum* is an example of a mordant, and may be safely used with any other colour.

165. *Gallnut* (Mázu Phal مازوپھل) is another mordant, and is used for the purpose of producing brown, dark-red, and other dark colours.

166. *Harra (Terminalia chebula* or *citrina)* otherwise myrobalan, is used to give fixity to yellow, dark-green, and black.

167. *Kasís* کسیس or *Sulphate of Iron* produces fast *kháki* and fast black. Iron produces black and is also used as a mordant in dark-blue and Turkey red.

168. *Pomegranate rind (Náspál)* is used as a mordant to produce fast yellow and fast green. The rind is taken from unripe pomegranates.

169. Silk dye-stuffs may perhaps best be classified under five heads :—

Silk dye-stuffs.

1. Aniline dyes (Bukni or Puriya); these are usually imported from Austria, Germany, and other countries in Europe—colours fugitive, though brilliant. The powders are sold at from 10 to 16 tolas a rupee, but a few are more expensive.
2. *(a)* Kiram or Kirmaz (Kermes, crimson or cochineal.
   (b) Imported mostly from Amritsar or other places in the Panjáb; colours pink, scarlet, and crimson. Allied to this is the red dye obtained from the lac insect in Mirzapur.

   Lac.
3. Kusum (Safflower, Carthamus tinctorius) for yellow or red; a vegetable dye. At one time Kusum plants played a considerable part in Provincial agriculture, but they are now distinctly on the wane.
4. Murabba or Tezáb dyes; old chemical dyes of Indian manufacture; the composition is generally held secret by such dyers as know them, and in fact these dyes are only rarely used now except to special order. Probably these refer to (1) Zangári (cobalt blue) produced with sub-acetate of copper, and (2) Kasís (sulphate of iron), which has already been mentioned as a mordant.
5. Mát (Indigo or *Nil)*; this dyes various colours with various mordants; Kamíla (Mallotus philippinensis) and Akalber (Datiscus cannabina) are used with it to fix yellow. Kamíla is probably the famous Waras dye of the Arabs, which seems to have been specialized in

mediæval Western Asia for the dyeing of silk. Kamíla is brought to Jhánsi from Chanderi in Gwalior Territory. (See, however, Agricultural Ledger, 1898, No. 16, "The Waras dye," which is there identified with a species of Flemingia.)

170. Numbers 1 and 3 are reputed fugitive, while numbers 2, 4, and 5 are fast. Aniline dyes, however, may be made more or less permanent by being boiled in a solution of soda, potash, sulphate of soda or borax, according to the chemical properties of the dye-stuffs used. In these provinces the fixing of aniline dyes is not usually attempted except in Benares and Agra. Saiyid Ghulám Mujtaba's firm in Agra claim to have succeeded in producing fast colours with these dyes.

171. The principal colours observed in silk fabrics will now be described.

Colours of silk fabrics.

172. The different shades of pink and red are great favourites with the multitude, and largely contribute to the gay appearance of gatherings at fairs and bathing *ghâts*. Red, it will be remembered, is the national Hindu colour. In point of number, the silk fabrics bearing this colour will be found to predominate in a given bázár, though with connoisseurs it is out of favour as being a common colour, and it certainly can be too gaudy upon occasions. *Pyázi* (light pink), *gulábi* (pink), *surkh* or *lál* (red or magenta), and scarlet (*sultáni surkh*) are colours that are very cheaply produced by aniline dyes, and this cheapness may also have something to do with the popularity of this group of colours. A sum of one to two rupees will generally dye a sér of silk-stuff. The *bukni* (powder) is boiled in water; the strength given depending on the lightness or depth of colour required, and the silk is steeped in it.

173. *Karaundiyá* (puce), *bádámi* (light buff), and *náranji* (orange) are colours usually produced by means of *kusum*, but the *karaundiyá* colour is expensive and costs about six rupees to dye a sér of silk thread. *Náranji* is still more expensive, and may cost as much as Rs. 10 per sér of dyed material. *Kaulái* (deep orange) and *kesari* (saffron) are usually obtained from *bukni*.

174. To produce good black in silk, indigo is used, but a *path* or preliminary infusion of *kattha* (catechu) is given before immersion in the indigo vat.

175. The usual greens are *káhi* (dark green), *sabz káhi* (light green), *máshi* (grass green), *mungia* (light yellowish green like the colour of newly ripe mung grain), and *sabz* (green). These are all *mát* dyes, *i.e.* capable of being produced with indigo and a yellow dye, though, with the exception of *máshi* and *mungia* they can also be obtained from *bukni*. These *bukni* greens, however, incline to blue.

176. *Kháki* (gray) and its different shades are produced from *kasis* (green vitriol, martial or sulphate of iron) and *harra* (myrobalans). *Kásni* (heliotrope) is a composite colour produced from indigo, a red and a yellow dye.

177. The blues most frequently met with are *áda* (purple blue), violet (*baijni*), *ásmáni* (sky blue), *ferozai* (turquoise blue), and *lájwardi* (*lapis lazuli*), the last being *par excellence* the colour of *minákári* work and *sangi*. These, as well as the following yellow colours, are usually got from *bukni*.

178. Of the yellows, the following shades are noticed in silk fabrics:—*zard* (yellow), *basanti* (primrose), *motiá* (yellowish red), *nimbui* (lemon yellow), *gandhaki* (sulphur yellow), *kapási* (pale yellow), and *káfúri* (straw coloured). *Haldi* (turmeric), is commonly used in Azamgarh district to produce yellow and its shades.

179. The gold and silver effects in *kamkhwáb* and *zarbaft* are produced by wires or threads in which the precious metals play a part, and need no more than a passing mention in a description of colours.

Weaving.

180. The process of weaving simple silk fabrics and the tools employed in it are not generally very different from the processes and tools employed in weaving other fabrics, but the Benares *kamkhwábs* and other gold and silver thread fabrics with a heavy body of

silk are woven with a device so ingenious that it will be worth while devoting a small amount of space to describe silk weaving.

Sizing of warp threads.

181. As the warp threads are subject to friction it is necessary to give them a dressing of size or paste. The size *(kalaf)* generally used is made of fine white wheat flour called *Nishástá* (نشاستہ). This is boiled and the threads dipped in it. In Benares a superior kind of size is made from the bulbous root of the *kandri* or *jalkandá* plant *(Commelina nudiflora)*. This root is boiled and strained through a perforated tin pan called *chichŕá* into a pot; where a fine viscous fluid collects, in which the warp is steeped. In Azamgarh district the juice of the tamarind seed *(Imli-ká-chiyán)* is used as an alternative to *kandri*. The men who give the size are called *Mandigars*.

182. The thread, after it has received the sizing, becomes somewhat stiff, and it has carefully to be dried in the sun before being available for the next process of arranging it into a warp. This drying process is somewhat troublesome when the weather is not fine. The thread is laid on a series of *sánchás* or cross sticks each fixed at right angles to a *laggi* or post. Each of these cross sticks carries eight glass rings: the ordinary glass *chúris* worn by women are cheap enough to serve this purpose. The thread passes through one of these rings in each *sánchá*, until it reaches the end of the series. At this end (called *adda)* it turns back through a small bamboo pulley, and passes through the second line of rings until it reaches back to the first *sánchá* which was its starting point and is therefore called *baithka* ("home"). Here it is rolled round a spindle or *kháli* from which it is again unwound and taken on to a *paraitá*. Meanwhile there are three other men at the *baithak*, each using a separate double row of rings. All this long process is carried on in the open air, if possible in the sun, so as to thoroughly dry the thread, and the repeated winding and unwinding makes it soft and elastic. It is now time to arrange the warp *(táná tanná)*.

183. The thread *(chinia* or *katán* or whatever other thread is used for the warp) is next wound round a *chhúnchhi* (چھونچھی), which is simply a wooden tube that revolves freely round a long iron needle, having a knob at the lower end on which the *chhúnchhi* rests. The whole instrument is called a *salái*. (See illustration.) Sometimes the *salái* has a wooden handle at the top made of reed grass (Saccharum sara).

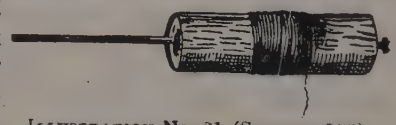


ILLUSTRATION No. 21 (SECTION 183).
SALAI FOR THE WARP.

184. With these *saláis* the thread is delivered to a *tanihárá* or arranger of warp threads.

Arranging of the warp.

He takes two of the *saláis* and goes to an open space where a framework has been put up for the arrangement of warp threads. Two pegs are fixed in the ground, six yards or more apart (according to the length of the warp required). Between these, at intervals of 10 or 12 inches, are arranged two rows of *senthas*. In each row is a series of *senthas* fixed in the ground either in the shape of an X or a V, so that the two upper points of the V or the X in all the *senthas* form one line of the row. (See illustration.) The rows leave a sufficiently wide alley between them to allow the *tanihárá* to walk along it. Let us say that there are 18 pairs of *senthas* in each row.

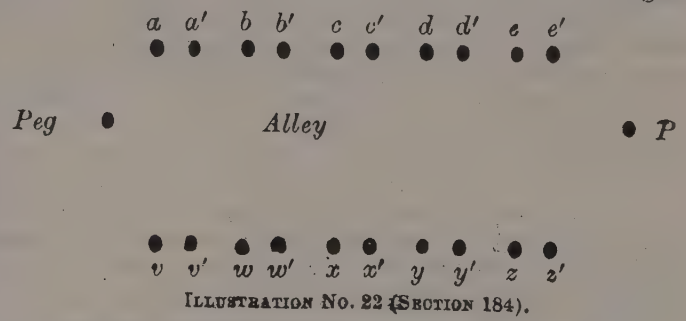


ILLUSTRATION No. 22 (SECTION 184).
[The points of the *senthas* as they appear in a bird's-eye view.]

Then in each row there are 36 points, or in the whole of the warp length 72 points in all, to claim the warp-maker's attention, arranged as in the illustration.

185. The warp-maker having attached an end of thread from each *salái* to one

ILLUSTRATION No. 23 (SECTION 184).

[The process of *táná tanná* the warp threads are being stretched out for the loom.]

of the end pegs, now walks through the alley with his two *saláis*, unwinding, as he goes along, each *salái*. He waves each hand carrying the *salái* alternately to and away from him. The result is that the path of the thread in either hand is traced, outside a and v, and inside á and v′ ; outside b, and w, inside b′ and w′ and so on alternately. The threads meet at the peg p, but on the return journey they keep to their own proper side, the threads of the series a, b, c, &c., going round a, b, c, &c., and of the series z, y, x, going round z, y, x, &c. On the return journey, however, of the *tanihárá* up the alley, the thread will go inside the points round which it went outside at first and *vice versâ*, and the thread of each series will cross itself between the *senthas*. He thus goes up and down crossing the threads until he has obtained a sufficient number of threads side by side arranged in this manner, the threads being crossed in as many places as there are *senthas*. Each of these points of *croissage* is called a *Sánthi* or *Bhánj*. The threads are now detached from the *senthas*, and inside the space between every two *sánthis* (those only which he wishes to preserve), an ordinary cotton thread is inserted to keep the *croissage* intact. For a fabric of a width of 14

girahs or 35 inches, a warp of 3,600 threads would be required. The *tanihárá's* wages are at the rate of one to two annas per hundred threads, according to the number of *sánthis* required. After a little practice he can do the work quickly and earn about eight annas a day, though the employment is not continuous.

Khanjari pattern in Mashru.

186. We have now got the silk Táná. For ordinary fabrics these would go immediately to the loom. But in the *Mashru* cloth the peculiar wavy pattern called *khanjari* (خانجری) (see illustration) is obtained by dyeing portions of the warp threads in a peculiar manner, and not, as in *sangi*, by an arrangement of threads of different colours in the loom. For *mashru* fabrics the warp threads are tied up in bundles of 10 to 14 together at intervals which vary with the fineness of the wavy pattern ultimately required. In fact the quality and price of superior qualities of *mashru* are gauged by the number of undulations that there are in a given length of the wavy line. The standard length is generally taken to be a span of 7½ inches. Thirty *khanjaris* in that length would be considered to make ordinary *mashru*; 45 would be considered very fine.

ILLUSTRATION No. 24 (SECTION 186). KHANJARI.

187. The warp threads are tied up in bundles by means of short strips of a well-known bark called the *Bhoj-patr* (the bark of a species of Birch), and then the whole mass of thread is put into the dye-stuff. When it is taken out again, the space left uncovered is found to be dyed, while that which was tied up in the *Bhoj-patr* is left its original colour. The principle is the same as that of dyeing *chunri* fabrics. The men who tie up the warp threads in this manner are called *Tanbandhas*, who are generally Muhammadans and get in wages from Re. 1 to Rs. 5 per *thán* or complete piece of fabric.

188. The threads having been dyed in portions only, it follows that each thread is, say, one-eighth of an inch yellow (the dye now given) and the same length red (the original dye). If the threads are now laid alongside, there will be alternate bands of yellow and red. In order to produce the angular wavy line, the ends of the threads are now arranged unequally. Suppose the threads are taken in systems of nine each. The points of the ends are so disposed that a line traced through them would form an acute angle of 36°. Thus:—

When the whole of the warp threads are thus spread out, the wavy *khanjari* pattern is obtained, yellow on a ground of red. The next process is weaving the fabric.

Weavers.

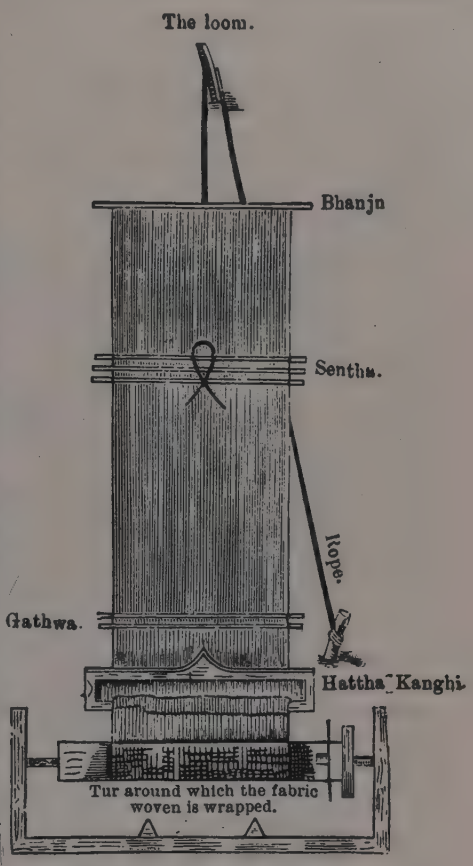
189. The weavers in most places are called *Juláhas*, but in Benares the weavers of expensive silk fabrics pretend to a style and title of their own. They feel insulted if called *Juláhas*, and prefer to be known by the name of *kárigars* (artists).

Weaving room and apparatus.

190. The room in which the loom is arranged is generally a small one and not well-lighted or ventilated.

The simplest arrangement of the loom consists in having a pole or beam called *bhanjni* at the end of the room farthest from the weaver. This is the warp beam. It is secured in the middle with a rope which is carried forwards to a peg or to another little *bhanjni* a few inches further from the weaver and right at the end of the room, and after being wound round it, is carried backwards again through a pulley and fixed to a peg at the end where the weaver sits. This rope is within reach of the weaver. The weaver himself sits on the ground, with his feet in a hollow dug underneath the loom. The loom is on a level with the ground and the weaver as he sits in his *kargah*

(hollow) is half buried under the loom. At his end is the second beam called the *túr* (تور) or *lapetan* (لپیٹن). This beam is the cloth beam. It is capable of being turned in a groove at each end. The fabric as it is woven is wound round this beam by simply turning the beam round and round, at the same time loosening the rope tied to the peg, so that the further end approaches nearer and nearer to the weaver as the work proceeds. The cloth beam contains holes in different directions through which pegs are let in to fix the beam and keep it in position while the weaver goes on weaving. Between the warp beam and the cloth beam are a set of *senthas* which keep the croissage of the warp threads intact. Nearer to the weaver are a set of *baisars*. Each *baisar* is merely an upright rectangular frame with threads running up and down parallel to each other (see illustration). In each there is an upper and a lower set of thread loops, which intertwine between the upper and the lower sticks of the frame. In the simplest loom there are two *baisars*. Every alternate warp thread is passed through the middle hole formed by the intertwining of a given set of upper and lower loops in one *baisar;* so that where there are two *baisars* the number of loops at B (see illustration) would be exactly half the number of threads in the warp. With more *baisars* the arrangement is complicated, with the object of raising sometimes one set of threads and sometimes another, and these not alternate ones. The *baisars* collectively are called the *Gathwa*. These work with the treadles, which are in the hollow beneath. The weaver with his feet moves the treadles (*páusars*) by means of footboards and *páoṇris*, one of which he raises and the other he depresses alternately, by a motion of the foot similar to that of the tailor at his sewing-machine As the *baisars*, the treadles, and the threads of the warp are all connected together, with each alternate motion of the foot is raised and depressed a different set of warp threads, which thus form a "shed" through which the shuttle is smartly passed by the weaver with the hand from side to side. This shuttle *(Nár* or *Dharki)* is made of horn—generally buffalo horn – with a smooth glazed surface which enables the shuttle to slide rapidly, while the revolution of the pirn or bobbin inside *(Nári)* unwinds the thread, which passes out through a small hole in a corner of the shuttle. This thread is the weft. As the weft thread passes from side to side, now over one set of warp threads, and under another, and then under the first set of threads, and over the other set, the network which forms the fabric is produced. By means of a *hattha* or *kanghi* (a comb-like instrument, the batten, also called the *Ráchh*), the weaver presses the weft threads close against each



The place where the weavers sit.

ILLUSTRATION No. 25 (SECTION 190).

THE BHANJNI.

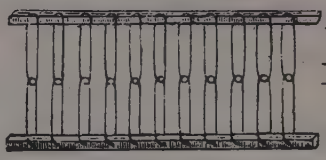


ILLUSTRATION No. 26 (SECTION 190).

THE BAISAR.

other as the fabric proceeds, and from time to time wraps the woven fabric by turning the *túr*.

191. Three more implements used in connection with the warp as arranged on the loom require mention. One is the *kúnch* or *kúncha* (کونچہ یا کونچ), which is a simple but substantial brush with a knob at the top for a handle (see illustration). This is occasionally applied to the warp threads to clean and smooth them both at the loom and in the preliminary process called *Táná tanná*. The *Ábgir* (ابگیر) is a broom-like instrument with which water is sprinkled now and again on the warp. The third implement is a pair of *panikhs* (پنکھ). The *panikh* is nothing more than a bow of two slender elastic bamboo sticks, the points being represented by iron pins. It is so made as to admit of contraction and relaxation to a given width. In the immediate vicinity of the weaver a pair of *panikhs* are stuck into the warp to keep the threads all duly spread out to the width of the fabric.

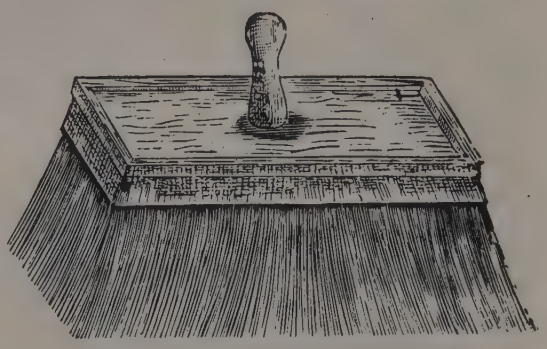


ILLUSTRATION No. 27 (SECTION 191).
THE KUNCH.

192. This is the simplest possible form of the loom (Dhánchá ڈھانچہ). It will be noticed that in a simple fabric the crossing of the network of warp and weft threads is simple. The weft thread passes under one warp thread and over another alternately, and on its return it passes over the first warp thread and under the other. But if a pattern has to be produced, the arrangement is not quite so simple. It may happen that the warp thread in a particular place has to pass over two warp threads at once, then under four warp threads at once, and so on for a short space; or again there may be an ordinary weft thread for the groundwork of the fabric and a different coloured weft thread for the pattern; or again there may be the usual ground weft thread, a coloured silk thread for picking out little points on the pattern, and gold and silver threads at the same time for the *kalábatun* work for which Benares is so celebrated. In these cases the arrangement for weaving is more complicated. There may be several sets of heddles, so arranged that on different occasions they raise and depress not all the alternate threads, but the threads irregularly, as required by the exigencies of the pattern. To provide for this a number of frames called *Pagiás* are used, which we now proceed to describe.

Crossing of warp and weft.

193. A Benares weaving room (*kárkhána*) containing a loom for the weaving of an expensive *kamkhwáb* with an elaborate pattern certainly gives one an impression of the nearest approach to machinery that we meet with in Indian weaving. The only difference is that there is not the same air of rapid motion and that inexorable working of exact rules that impresses one in a machine room. Instead of hurry, noise, and uniform punctuality in the sequences of the different operations, there is the usual oriental quiet, and a slow, easy-going method of procedure, under which, however, there lies a considerable reserve of skill and pride of artistic workmanship.

Benares brocade looms.

The design of a cloth is first worked out by the designer. Every *kárkhána* or factory has a designer retained by it who draws up designs to order or invents new ones according to his own ingenuity. We shall study the subject of designs in the next chapter. It is enough now to say that the designer *(Náqshaband)* after having drawn the design and submitted it for approval, makes a little model in a framework which is hung up over the *Pagiá* vertically at a short distance from

the principal weaver, for in a complex fabric there may be two or three weavers at once. In this model the design is represented in cotton threads, of which the ends are left hanging over and joined to the warp threads. The weft threads of the fabric are assisted in their irregular passage through the weft by vertical threads in the model, which form the required "sheds" by raising the proper number of warp threads and no more. Over the model are strings that connect it with the ceiling in such a way that ordinarily this model hangs fairly easy between the ceiling and the loom. Over the loom, and in the part where the

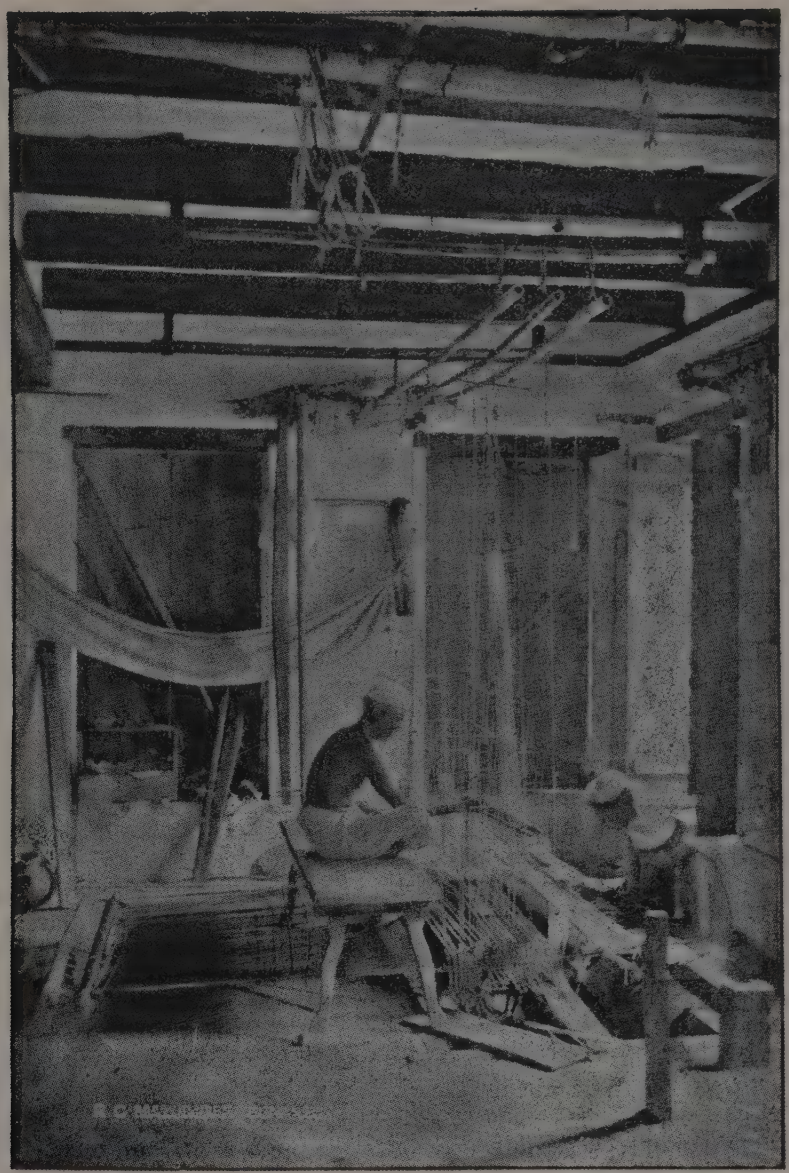


ILLUSTRATION NO. 29 (SECTION 193).

[This shows the loom. The weaver is sitting at the right corner holding the shuttle in his left hand. The *kárkhána* being small and dark, the windows behind the weaver had to be opened, which caused the figure of the weaver to be blurred. The boy sitting over the warp is manipulating the *pagid*.]

design is worked, is placed a plank right across the whole length of the loom. On this plank is a boy, seated or standing, who has a forked instrument called the *mándha* (see illustration) with which he picks up, by the help of the model, just the exact number of threads of the warp which have to be raised in order to produce the pattern. Sometimes he has to keep this number of threads raised for a few minutes together in order to allow the weaver to mark out the *minutiæ* of the pattern in gold or silver threads with the hand, and for this purpose he inserts an L-shaped instrument called the *Suá* (see illustration) hanging from the ceiling, with the horizontal leg pointed at the end, into the web so as to keep the particular warp threads raised as long as is necessary. All this elaborate arrangement for the production of the pattern is known as the *Pagiá.*

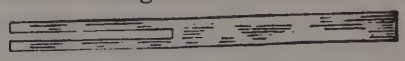


Illustration No. 28 (Section 193).
THE MANDHA.

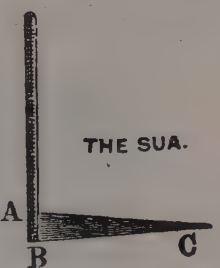


Illustration No. 30 (Section 193).

194. There are so many articles hanging from the ceiling over the loom that a glance at their frame-work is necessary. Suppose that the weaver is sitting, as he usually does, with his face turned towards the length of the room. Along the length of both sides of the ceiling, *i.e.* to his right as well as to his left, are fixed two strong bamboos which are called Lapás-ke-báns (لپاس کے بانس). Across them are a series of cross bamboos from which hang the various articles which are over the loom. These comprise (1) the Hattha, which has its own bamboo; (2) the Pagiá, which has its own bamboo, generally extra strong and twice as thick as the others; and (3) the Gathwa or collective Baisars, and the Gulla which are hung from a complicated system of bamboos and levers termed the Gulle-ke-báns.

195. This is a system of bamboos whose planes cross each other at all angles. They remind one of the yards and spars of a sailing vessel of the old sort without the sails. Suppose there are 10 *Baisars.* To hang them all independently would not be possible without spreading them out over a space that would make their manipulation practically impossible for textile purposes. They are therefore joined, every two to a single pole, by means of vertical ropes, producing eight poles in all. These eight poles in their turn are united in pairs at an upper stage, reducing their number to four. These again unite in the third stage to two, which at the fourth stage become one. This one pole or bamboo is the *Nachná,* while all the minor bamboos at the different stages growing more numerous as they descend towards the loom are called *Nachnis* (نچنی). The name *Nachni (la petite danseuse)* is in playful allusion to the swinging or dancing motion exhibited by these poles when the loom is in full working order. There is also a leverage apparatus of bamboos, known by another series of names, which need not be further detailed. The reason for having the planes of these *Nachnis* at different angles is now obvious. If it were not so, the parts of this complicated system would clash against each other and break the harmony of this simple, but beautifully-devised, machinery.

196. In every loom the warp threads are not stretched to their full length at once. The length to which they are stretched depends upon the accommodation available in the room as also on the fact that the peg at the farthest end called "*Agela*" (اگیلا अगेला), and the *Bhanjni* to which the warp threads are stretched should not be too far from the "*Túr*" where the weaver works. Generally the "*Bhanjni*" should be at a distance of 2½ or three yards, and the "*Agela*" at a distance of four to 4½ yards, from the position of the weaver. The portion of the warp threads that does not come between the "*Bhanjni*" and the *Túr* is gathered together and tied up to a string hanging from the roof. They are, however, so connected with the final rope that is carried backwards towards the weaver that he can, by relaxing it as his work proceeds, release more and more of the prepared

warp, that has been so gathered in, to take the place of the woven fabric that is tucked over the *Tár*.

Páis or layer of warp thread.

197. The series of silk threads stretched out for the warp are called collectively a "*Pái*" (पाई پائي). Ordinarily there is only one series of the stretched silk thread, *i.e.* only one *pái* which forms the ground or "*zamin*" (زمين) of the fabric; but in making patterns a second series of threads is stretched parallel to and below the first series. In this case there are two "*Páis.*" The threads composing the second "*Pái*" are stretched, extended or contracted by the same kind of apparatus as that described above for the first series or "*Pái.*" There are then two *Bhanjnis* and two *Agelas*. There is, however, this difference that the cord connected with the *Bhanjnis* of this second "*Pai*" is not taken and tied to a peg near the position of the weaver, to be loosened or fastened as he likes, but is passed over a pulley set up sufficiently high somewhere between the "*Agela*" and the weaver's position, and worked by means of a heavy pendulum of sufficient weight.

Patterns how produced.

198. It is by means of an increase in the number of *Baisars*, *Páoṇris*, and *Páis* that different crosses, flowers or varieties of patterns are made. The *Páis* have to be increased only in complicated cases, otherwise an increase in the number of *Páoṇris* or *Baisars* generally serves the purpose. The number of *páis* or layers of warps also regulates the thickness of the fabrics. A fabric containing five thicknesses of warp would be called *páchpaṛa*, seven thicknesses *sátpaṛa*, and so on.

199. *Sangi* is woven with two *tánás* (warp threads) of different colours together; hence the name (*sang*—together). The *tánás* are of different colours alternately, and the *khanjari* pattern is thus produced by an easier and cheaper method than that practised for *mashru*. The peculiar way in which the threads are dyed in *mashru*, however, produces a *khanjari* that is superior in brilliancy and more prized. The difference is small to a casual observer; but taste and fashion account small and subtle differences to be the very *criteria* by which to distinguish the circle of the *élite* from the vulgar crowd. In making *chárkhánas* (*i.e.* checks) the Báná weft threads, too, are of different colours and kinds. In fabrics in which gold and silver threads are used (*kalábatún*) there may be a whole layer (*Pái*) of this kind of threads, and other layers of silk warp according to the kind of fabric intended to be woven.

Weft *kalábatún*.

200. The *kalábatún* (gold and silver threads) intended to be used for the weft is not put into an ordinary shuttle of horn. If *kalábatún* were so treated the thin sheathing of the precious metal round the silk thread would come off in unwinding from the bobbin and passing through the shuttle hole. For weft *kalábatún* a simple stick of bamboo well polished and pointed at both ends is used. It is called a *Kándhi* (see illustration). A very superior quality of bamboo has to be used in making it; the bamboo generally used is imported from Purneah in Lower Bengal. The *kárigar* has a number of these *Kándhis* placed beside him: he may require the use of several of them at once in a complicated pattern.

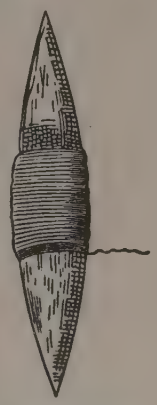


ILLUSTRATION No. 31 (SECTION 200). THE KANDHI.

Thán or piece of woven fabric.

201. We have now got the *Kora Thán*, the virgin woven fabric. This is now taken off the loom. But as the arrangement of each loom is a matter of considerable skill in the case of the expensive fabrics, the loom is not all broken up at once, so that no vestige should be left behind. On the contrary a certain length of the arranged warp threads (generally eight or nine inches) nearest the Bhanjni end is retained as a sort of pattern in case a similar *thán* is ordered in future—much as a printer would retain his fount of type. Should such a

thán be again commenced, the Mistri-weaver, who fits up the loom, joins on the new warp threads to the *kattan* or leaving of the old one, and so on from *thán* to *thán* until the *kattan* gets too old or too long, say two or three yards. In that case the *kattan* is sold up and utilized by *patwas* as more or less waste thread. Of course when the *kattan* is put away the *Bhanjni*, the *baisars*, the *hattha* and *kanghi*, and other instruments connected with it are also put away; for the peculiar way in which they are disposed in each warp constitutes the distinctive peculiarity of that ward. When the *kattan* is taken down for use again, the new warp threads are joined on to the old, and the old implements are simply slid back, which with the detachable implements put on and adjusted give again the old loom.

Kattan

202. In the fabrics known as *Sangi*, *Gulbadan*, *Mashru*, and thick *Kamkhwáb*, the woven *thán* or piece is washed, cleaned, and folded, and its uppermost fold glazed before it is put away for sale or forwarded in compliance with a customer's order.

The work is performed by a *Kundígar*. For an ordinary *thán* he prepares a mixture of the juice of 10 lemons, a quarter of a sér of sugar, and water sufficient to immense the *thán* to a depth of two inches. If the fabric contains silver *kalábatun*, *aritha* or *ritha* nuts (soap-nuts) are substituted for the lemon. This adds to the brilliancy of the silk and is considered particularly necessary to set off fast colours. The washing properties of the coating of *aritha* nut (Sapindus emarginatus) are due to the presence of an acid called Æsculic (or æsculetic) acid.

Kundígar's work.

203. The *kundígar*, after washing the *thán* as above, presses and folds it. He lays the fabric on a block of wood called the *kunda* (کنڈا) (from which the *Kundígar* takes his name), which serves in place of a stool. The upper surface of the block is perfectly smooth and level. He then takes two *pitnis* (پتني), one in each hand and commences to rub the fabric in the same way as a *dhobi* uses his iron. The *pitni* is a wooden implement, consisting of a flat blade joined to a handle somewhat like a paddle (see illustration). In this way any *kalábatun* or other patterns that may happen to stand out of the surface of the fabrics are smoothed down.

THE PITNI.

Illustration No. 32 (Section 203).

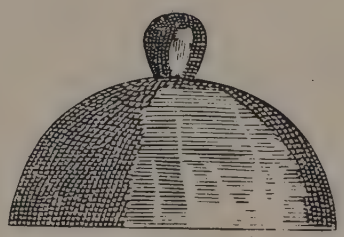


Illustration No. 33
(Section 203).
THE MOHRA.

A further process of rubbing with the *Mohra* (see illustration) is followed by the folding of the cloth. The topmost fold is well beaten with a mallet, smoothed once again and glazed, and then the *thán* is ready.

Smoothing and calendering.

204. The smoothing and calendering process in Agra is thus described by Saiyid Mujtaba, silk manufacturer, of that city :—

"Calendering is done by means of manual labour and is very tedious work. When a cloth is to be calendered and smoothed, it is made wet and spread over a table, and then it is pressed by means of iron rods heated on burning coals. This also produces a wavy or watery effect on cloths. The process is called *Uttoo* (اُتّو)."

CHAPTER V.

Designs and Patterns.

Designing of patterns.

205. The art of designing the patterns of silk fabrics is scarcely known outside Benares. Agra is the only other city which produces silk fabrics of any pretensions, but these do not introduce elaborate designs. The Agra firm (Messrs. Mujtaba and Company) generally revive old designs which have historical associations with the silk industry of these provinces. Where silk fabrics are woven in other districts, they are of a simple or of a coarse texture and their patterns require no designing.

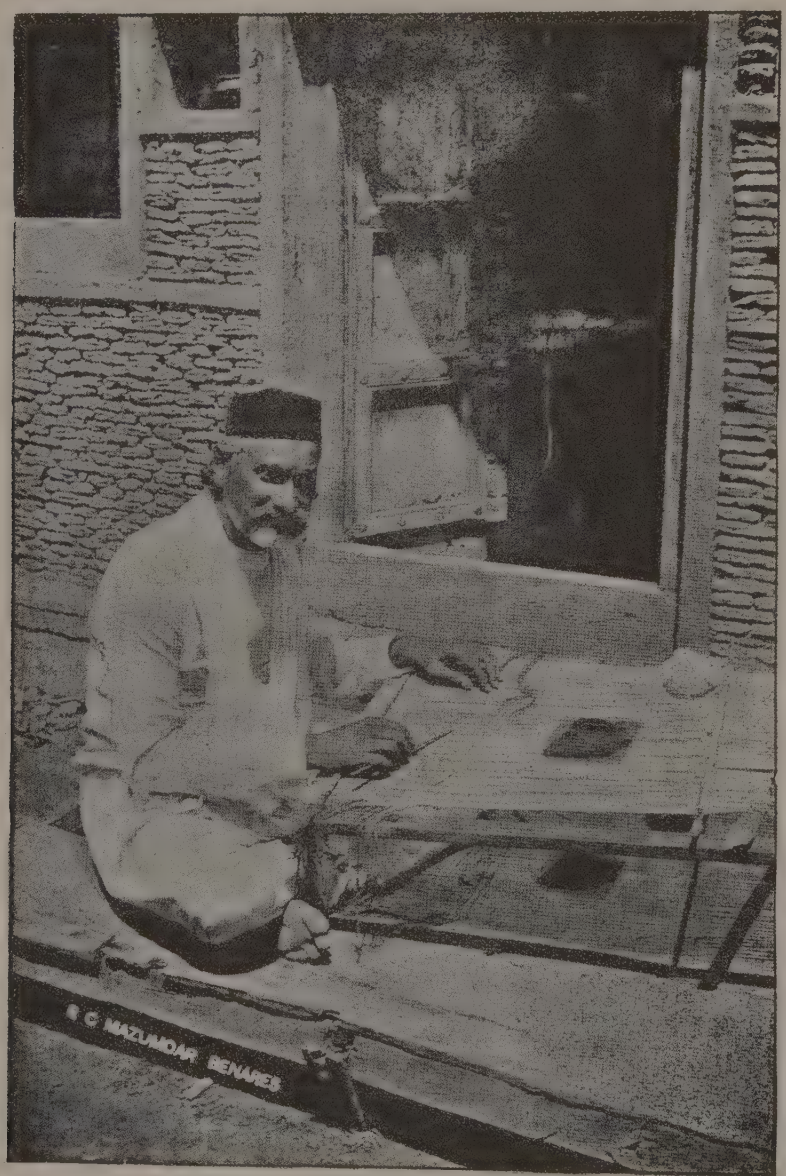


Illustration No. 34 (Sections 206—208).

Muhammad Husain, designer, of Benares, at his work. From a drawing in talc on the design frame he is working the *pagia* in cotton threads.

206. Benares, being the manufacturing centre of the brocade industry, offers great opportunities for the display of talents in the way of designs for these expensive gold cloths. There are two noteworthy designers (*naqsháband*s), *viz.* Tajammul Husain and Muhammad Husain. They have both been at the Empire of India Exhibition and the India and Ceylon Exhibition in London during the years 1895-96. Travel appears to have sharpened their wits. They got new designs in their *velayati* tour, many of which they are introducing in Benares work now. If it is intended to send any designers or weavers to the Paris Exhibition next year, Mr. Keane, I.C.S., Assistant Collector of Benares, recommends them as suitable men for the purpose.

Benares designers.

207. At present the designs are usually worked out in paper instead of the *abrak* (talc) formerly in use.

208. It is marvellous with what accuracy and ease the designers are able to work out an elaborate design with their steel points on the unpromising-looking *abrak*, where that material is used. Having drawn the design and obtained the approval of the owner of the weaving establishment for which it is intended, the naqsháband next makes out a model in cotton threads to be used in the manner already described in the chapter on weaving.

209. We now come to a study of the designs. Apart from the case of the two designers mentioned above, new designs are made every day at Benares, but they are as a rule wanting in originality. They are mostly variations on old designs. The designers are usually Muhammadans, and consequently they introduce living beings in their designs as sparingly as possible, though of course in executing orders they have to comply with their customer's wishes. Photographs of celebrities are sometimes copied in. A complimentary Jubilee piece was woven with a picture of the Queen in a rich gold fabric. I have before me the rough design of a picture of the late Mahárája of Benares transferred (or to be transferred) to brocade. Various mythological designs, *e.g.* the Fish Incarnation of Vishnu, also occur, and tigers, lions, deer, peacocks, and other birds are reproduced, sometimes with remarkable felicity. But such designs usually occur in large pieces made to the order of Rájas or other wealthy personages for hangings or decorations to their rooms.

Designs.

Pictures.

210. These, however, are special designs and do not admit of analysis; they are called *Tasáwir* (pictures), and may include historical groups.

211. In describing silk fabrics we shall have to use a number of technical terms as regards patterns, which it would be convenient to consider together here.

Technical terms.

212. The simplest pattern is the stripe; when the stripes are longitudinal, the fabric is a *Ḍoriya*; when the stripes run along the breadth, the fabric is *Salái-dár* (specimen 49); when the lines are diagonal, it is *árá doriyá*.

Lineal patterns.

213. When the line is wavy and angular, the pattern is *khanjari* and the cloth *khanjaridár* (specimen 68). *Khanjari* is sometimes called *Laharia*, but the latter is larger, and usually has rounded corners.

214. When the stripes run both latitudinally and longitudinally, we have a check *(chárkháná)*, (specimen 142), which may be either square or rectangular.

215. A set of small lozenge-shaped figures form the *Iláyecha* pattern (specimen 47); the same kinds of figures enclosing dots of some material (silk or *kalábatun*) are called *Bulbul chashm* (nightingale's eyes).

216. A double line containing a simple or running pattern inside, is called a *Mothra* and is generally used as a border to some other patterns or as marking the division between different portions of a complex pattern. In specimen 76 four Mothras are shown, dividing the fabric into broad stripes.

217. There are various kinds of edgings known by different names; the *kangúri* edging *(daur)* is the most common; see the border edging in specimens 6 and 36.

218. So far the simplest elements of a pattern, which are lineal. We now come to floral patterns.

Floral patterns.

219. If there is a running pattern of leaves and flowers all over the ground-work of the fabric, the pattern is *phulwar*; in some kinds of fabrics, where it is raised slightly above the ground-work of the fabric and is of the same colour as the groundwork, it is called *Váskat* (specimen 65).

220. Complex floral patterns consist of *bels*, *butis*, and combinations of these. A *buti* when it is large is called a *buta*.

221. A *bel* is a running floral pattern, with a width of a few inches, and in its length repeated over and over again; a good specimen of a simple *bel* will be found in specimen 38; in this particular case it is a *khajúri bel*. The *bel* pattern may also be designated the creeper pattern.

Bels.

222. When the *bel*, instead of running in a straight line and parallel to the border, goes diagonally or in undulating lines, it is called *Âri bel*.

223. The *buti* is a single flower or figure, not joined to a running pattern; it is in the development of the *buti* and the invention of new forms of it that the designer for textile fabrics generally

Butis.

ILLUSTRATION No. 35 (SECTION 223).
BUTAS AND BUTIS.
[Nos. 1 and 2 are *bútas*; the rest are *bútis*.]

spends his ingenuity. In fact it may be said that the fashions in *bútis* vary every year as much as the fashions at M. Worth's.

224. The names of a few of the *bútis* in vogue will now be examined :—

A *chanda* is a circular pattern in the centre of fabrics like *dupattas*. It has merely a circular outline, with floral or geometrical designs filled in. Though a true *búti*, the artisans refuse to give it that name.

225. A *turanj* is the characteristic *búti* in shawl patterns; when the pointed end is turned round and further adorned, it is a *kalghi búti* or (if large) *kalgha búta* (see illustration 36).

ILLUSTRATION No. 36 (SECTION 225).
KALGHA BUTA.

226. A *pán búti* is heart shaped; it is essential to a bridal *chádar*.

227. A *fardi buti* is one in which the effect is produced by points or dots; specimen 18.

228. There is a fan-like *búti* which is called after the number of petals it contains; thus *tín-pankha*, three-leaved, *sat-pankha*, seven-leaved; a good example of the latter will be found in the bigger *búti* in specimen 130.

229. *Tárá búti* is a circular or square *búti* supposed to resemble a star; such are the small *bútis* in specimen 130.

230. The *Jámewár búti* resembles the conventional representations of bushes in the landscape of old pictures; see specimen 61.

231. *Ashrafi búti* is a gold *búti* of circular shape; specimen 31.

232. *Búti jhár-dár* is an ambitious *búti* comprising a whole sprig or branch; see specimen 127.

233. *Búti minátáshi* is any of these or the succeeding *bútis* worked in different coloured silks in a gold cloth; specimen 55.

234. Then there are the *phúl bútis* (flower *bútis*) called after the various flowers; such as *chameli* (Jasmine), *gul dáúdi* (Chrysanthemum); *genda* (Marigold); if any of these *bútis* is worked in a *bel* pattern, with a creeper, the *bel* would be called by a similar name, *e.g. gende ki bel*, &c.

235. A further development in patterns is to enclose a *búti* in a net work of geometrical patterns in compartments or closed figures; such a pattern is called *jál*, and would be distinguished thus: *jál bích turánj búti*, *i.e. jál* enclosing *turanj buti*, &c. Illustrations 37 and 38 shows four specimens of *jál* patterns, and a great many will occur in the description of the fabrics.

Jál patterns.

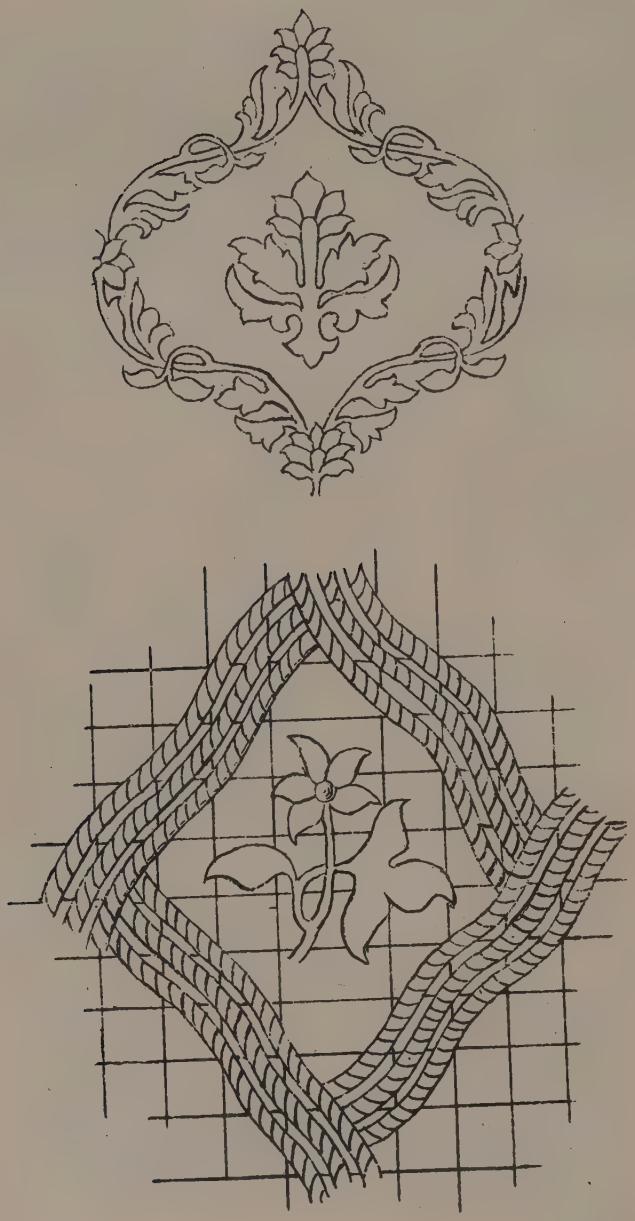


ILLUSTRATION No. 37 (SECTION 235).

JAL PATTERNS.

ILLUSTRATION No. 38 (SECTION 235).

JAL PATTERNS.

[The ground work is of gold. The leaves, green. The flower, rose-coloured and yellow.]

236. A still further development in complexity of pattern is reached in the *jangla* or woodland designs. These are more free from conventionalism than the others, and show a desire on the part of the designer to get closer to nature, though the true principles of art in textile fabrics will always demand a certain amount of conventionalism. A fine specimen of a *jangla* design is shown in illustration No. 38.

Jangla patterns.

ILLUSTRATION No. 39 (SECTION 236).
WOODLAND OR JANGLA DESIGN.

237. We have considered all the more characteristic patterns. A few more details will be obtained when we come to describe the fabrics in detail.

Colours in patterns.

238. A word as to the arrangement of colours in designs. As far as the best *kamkhwáb* work is concerned, it will be found that there is a harmony in colours of the *kalábatun* (gold or silver) and the *mináḳári* (coloured silk work), which is not purely accidental. Yellow leaves or green flowers may appear contrary to nature, but in textile patterns the object is not to produce a picture but to produce pleasing effects in colours, and the harmonies of colours, though not studied on fixed definable principles, are nevertheless (by the best workers) kept in view. A favourite device that will be noticed for harmonizing a contrast of brilliant colours is to introduce paler colours to serve as links, and this accords with one of the principles laid down by Mr. Owen Jones in his Grammar of Ornament.

239. In the best *ghaltás* and *sangis* of Azamgarh the colours will be found well blended together, though examples of a debased taste are becoming commoner than they used to be.

CHAPTER VI.

Collateral Industries.

240. A short account of collateral industries connected with silk fabrics will not be out of place.

241. In almost every district in the Provinces are silk braid-ribbon-and-fringe-makers called Patwás, who also string beads and jewellery, make small, ladies' purses *(batwás)*, and the Hindu ceremonial symbols called *rákhis* and *anantas*.

The Patwa.

242. The Rákhi is the ribbon (silk generally; but cotton is used by those who cannot afford silk) tied universally round the upper arm by Hindus on the Rákhi-bandhan or Raksha-bandhan festival (Sáwan fullmoon). The Ananta is a similar ribbon used on another festival day Anant Chaudas (Bhádon Sudi 14).

243. The trade of the Iláqeband is similar to that of the Patwá. Only the Iláqeband is a Musalmán while the Patwá is a Hindu. The Iláqeband is found in a few large cities like Lucknow, while every town, large or small, and some villages contain patwás to supply the ordinary needs of the population in the matter of miscellaneous articles of silk. The Iláqeband, on account of his religion, proscribes the making of Rákhis and Anantas, and is therefore less in touch with the general population. On the other hand he makes expensive miscellaneous articles of silk, for example, *palang-dori* (strings for bed covers), *Izárbands* (paijáma string girdles), *Náras* (similar strings for lhengas), *Jhálars* (fringes), *phúls* (pompoms), *phúndnas* (tassels) for fezzes and other articles of dress or upholstery, and in fact any miscellaneous articles of silk thread, such as lashes of whips, the bridles and cruppers of old-fashioned native saddles, horses' headstalls, nets, &c.

The Iláqeband.

244. In many of these articles gold and silver threads are introduced. The silk and kalábatún loops and spherical buttons *(ghundis)* used for garments of gold brocade are also included in the productions of this trade.

245. Except for the differences pointed out above, the work of the Patwá and that of the Iláqeband tend to approximate more and more, and it would not be unfitting to describe them as they have been described in the census statistics, as silk-braid-and-fringe-makers. A great quantity of silk, especially waste silk, is consumed in this industry. *Kachar* (see section 141) is often employed.

246. *Kachar* is obtained from waste rags of silks collected together in large cities by a special class of dealers called Paráchiyas, who buy up from tailors and others, rags, remnants, and cuttings of expensive silk cloths and cloths containing gold and silver worked in them. The Paráchiya keeps such articles as he expects to be in demand for mending or patching expensive materials. The rest he picks to pieces, separates the gold and silver to be sold separately, while the silk refuse is sold to *patwás* as *kachar* for making pompoms, paddings, &c.

Paráchiyas.

247. Another source of the supply of silk for Patwás' work is *kattan*. Ordinarily, when a silk weaver prepares a particular pattern of silk fabric on his loom he leaves about five or six girahs (= about 13 inches) of waste threads unwoven for convenience in the manipulation of the treadles. In Kamkhwáb and Amru an even greater length is thus left. In preparing a second loom requiring the same arrangement of warp, all he would have to do would be to join an equal number of threads to the already arranged system of threads which he had left unwoven from the previous loom, and which is known as *kattan*. When this *kattan* is disposed of it is bought up by Patwás and the threads used for the stringing of ornaments such as *Joshans* (armlets of

Kattan silk.

gold or silver beads), *Bázúbands* (armlets with folding *pallas*), *Alibands* (armlets with single or triple gems, &c). Charms (*Taawízes*) are similarly strung up by Iláqebands.

ILLUSTRATION No. 40 (SECTION 248). PATWA'S CHARKHI.

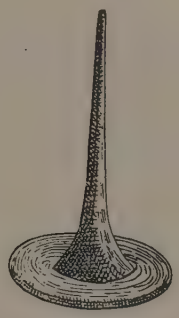


ILLUSTRATION No. 41 (SECTION 248). PATWA'S THANNU.

ILLUSTRATION No. 42 (SECTION 248). PATWA'S HOOK.

Patwás' tools.

248. The tools used by the Patwá are few and simple. He has of course the indispensable pair of scissors and knife. He has in addition a long instrument called *charkhi* which serves for a reel (see illustration); a wire hook, which he fastens either on a stand called *thannu*, or on the big toe of either foot as occasion might require (see illustration). He works on the ground with his lissome body bent forward, occasionally using his teeth to cut the thread while his deft little hands are employed in twisting or braiding.

Huqqa snakes.

249. A great quantity of silk is also consumed in the ornamentation of *huqqa* snakes *(náichás)* The class of people employed in this industry are called Náichábands; but where there are no Náichábands, the Patwás take a turn at this work.

Silk entwined ropes.

250. Ropes entwined with silk are used for Sáwan swings, for the nose-strings of favourite bullocks, and for tents made of *zarbaft* (cloth of gold) still in demand in opulent Native States. The industry flourishes in Muttra district. On account of the association of Bindrában with the gay festivals connected with Krishna, the Sáwan festivals in which women swing, singing the while of the loves of Rádhá and the merry Rás Mandal, are observed there with particular *éclat*. The special day for this is Jhúl Játra, Sáwan Sudi 3 The rope-entwining industry is well established in Muttra and gives employment to about a hundred men and women. In entwining ropes with silk the man's wages are about four annas for every sér of rope. The amount of silk entwined round a sér of rope is about one chhaták or one-sixteenth of a sér One man can do about a sér of rope daily and the market price of the product would be about Rs. 2-2-0.

Embroidering caps.

251. The embroidering with silk of caps on velvet or silk is another industry connected with silk. Such embroidery is generally prepared by Khatri and Káyasth women for the market; but the art is considered an accomplishment in ladies of the middle and higher classes, both Hindu and Musalmán, who of course do not sell their work. Amroha in Moradabad district and Meerut are noted for the cap-embroidering industry.

Embroidered fabrics.

252 As regards embroidered fabrics the Agra Exhibition of 1867 showed that India still at that date maintained her position. The report says (page 259) :—

"In designs and novelty, there is neither a retrograde nor progressive step and "to preserve and advance it, native originality rather than European influence "should be encouraged."

This remark still applies at the present day. Some of the specimens produced at the present day show a workmanship and taste in designs and colour which it would be difficult to beat under the circumstances. A great deal of the best work is no doubt turned out by professional workmen in Lucknow; but it must be remembered that the most delicate as well as the most expensive work is done in the *pardah* by educated ladies who turn out new patterns and designs according to their limited opportunities. These never come to market, but are far superior in refined elegance to the work of professional workmen, which if it shows greater finish, tends also to remain on a dull level of uniformity.

Kalábatún or gold and silver threads how manufactured.

253. We now come to the manufacture of gold and silver threads *(kalábatún)* to which reference has already been made in the chapter on weaving. As we shall see in examining the fabrics, *kalábatún* is very largely used in the *kamkhwáb* manufactures of Benares, and consumes a good quantity of silk.

254. To prepare silver *kalábatún*, a thin bar of silver *(kandíla)* which can scarcely yet be called a wire, is drawn out. It is beaten and drawn through a succession of holes in an iron plate *(jantri)*, each hole being smaller than the preceding one, till a wire about one-twelfth of an inch fine is obtained. It is further pulled out to the required fineness by means of a wheel and axle apparatus. Two *charkhas* (wheels) and a *jantri* again come into use, until the wire is so fine that it can easily be wound round silk thread. Strong, white silk thread is then taken, and the silver wire after being slightly flattened is so twisted round it as to entirely (or very nearly) cover the thread. This is *rupá kalábatún*.

255. For gold *kalábatún* the basis is again silver wire, gold not being sufficiently ductile and hard to yield a pure gold wire suitable for *kalábatún*. The gold is added at the *jantri* in the final stages; as the silver wire passes through the hole, heated with the quick motion with which it is drawn, it acquires a coating of gold. This is "gold wire," which is twisted round yellow silk thread to make gold thread (*soná kalábatún*).

256. An inferior gold thread is made by giving a very light coating of gold and helping out the effect by the use of *haldi* (turmeric) which intensifies the pale yellow tinge. This is the cheap *rási kalábatún*.

257. If the *kalábatún* (either silver or gold) is so closely twisted that the thread is entirely covered by the precious metal, the product is heavier and more costly than when the thread is just visible through the spirals of the wires. This superior *kalábatún* is called *baṭṭan-ká-kalábatún*.

Bádlá.

258. Gold or silver wire is sometimes not drawn out quite so fine as that used for *kalábatún*; it is flattened and sold as *bádlá* (flat wire). Bádlá therefore contains no thread in its composition. It is used in weaving the fabrics called *Táshbádla*, and other fabrics which we shall describe in detail in the next chapter.

Trimmings of silk garments.

259. The trimmings of silk garments consist generally of (1) *gotá-kanári*; (2) *lais*, and (3) *zardozi*, besides hems and borders of gold and silver work known under different names.

260. *Gota* is a narrow fabric in which *bádlá* forms the warp and silk thread the weft. The width varies, and different names are given according to variations in width, thus—

i.—*Dhanuk*, is about one-eighth of an inch in width.
ii.—*Gota*, about one-fourth of an inch.
iii.—*Lachka*, about 1¼ inch to two or three inches.
iv.—*Pattha*, to eight inches.

Dhanuk is further curled up with the finger nails into *gokhrú* or *chutki*, or again is sewn in an angular wavy line in the form of *murmura* or *jawa*. *Kanári* is a *gota* fabric so woven as to show the pattern known as Iláyechá (section 215).

261. *Lais* (from the English word *lace*) is a narrow fabric in which silk forms the weft; but the warp contains both *bádlá* and *kalábatún* and sometimes also silk; the texture is loose.

262. *Zardozi*, also known as *kár-chob*, is worked by stretching a silk fabric tightly on a frame (*aḍḍa*) like a child's *chárpái*. The materials it employs for embroidery are *salma* (a hollow spiral tube of the precious metals), *sitárá* (a tiny round spangle of the precious metals), or *kaṭori* (a cup-like spangle). The thread with which these are sown is of silk.

263. A hanging garment like a *dupaṭṭa* may have its own woven border, to which may be added a *banat* (or ribbon with different kinds of gold and silver work), with a hem or *kaitún* of rolled up *dhanuk*, which may further have a *jáli* or netted work of *moti* string (a beaded line of *bádlá* and silk), the whole ending in a fringe. The *moti* string is also employed to hide the seams of gussets and borders.

Chikan work.

264. *Chikan* work, a species of fine embroidery for which Lucknow is noted, is not now done so largely in silk as it was formerly. The work is close and strong rather than soft, and is better adapted to cotton.

Printing of silk.

265. The printing of silk fabrics has also been largely abandoned. It used formerly to be done in Kishanpur, tahsíl Khaga, district Fatehpur; but the industry is extinct.

CHAPTER VII.

Silk Fabrics described. Those woven for specific uses.

Textiles divided into two classes.

266. Dr. Forbes Watson in his "Textile manufactures and costumes of the people of India," divides Indian textiles into two classes, namely—(1) loom-made articles, like scarves and *sáris*, which are ready for use from the moment they are taken off the loom; and (2) piece-goods, or those which have to be cut and sewn before they are ready for wear. Loom-made articles he further sub-divides into loom-made articles of male attire and loom-made articles of female attire. He says on the authority of another writer: "It would appear that before the invasion of India by the Muhammadans, the art of sewing was not practised there."

(1) Fabrics woven for specific uses.

267. We shall, in describing silk fabrics, adopt the main division of Dr. Forbes Watson, though with a slight difference in classification. Our division will be into (1) Fabrics woven for specific uses, and (2) Fabrics woven for general purposes. The advantage of this modification will be that our account will be exhaustive, including such articles as chess-cloths, *masnad* covers, saddle-cloths, &c., which are not articles of personal attire. Our class I. will include all fabrics whose ultimate destination is held in view at the loom, although they may require the use of scissors and needle before they can be actually worn. In fact there are few articles that are ready for wear the moment they come out of the loom. Handkerchiefs, shawls, and scarves woven in silk require to have a hem put round them before they are used, and in many cases borders and trimmings are added. *Cholis* (bodice-pieces) are made in particular patterns, and a woven *choli* cloth is of no use for any other purpose; though when it comes out of the loom it has to be cut and sewn for dress. In the *lhenga* (section 387) an upper border has to be added for receiving the girdle string, and other little processes of sewing are necessary, but still a *lhenga* piece is sold entire and is of no use for any other purpose. Under Dr. Forbes Watson's classification the *lhenga* does not come under class I, but in our classification it will. The test is: Is the fabric woven for specific purposes, or for general purposes? If the former, it will fall under class I; if the latter, under class II.

(2) Fabrics woven for general purposes.

268. Fabrics of class I are generally woven, one on each loom; but in small articles such as handkerchiefs or *cholis*, one loom would contain several garment pieces and each of these garment pieces might be sold separately. In fabrics of our class II, the whole piece or *thán* would be made of varying length; and it would be sold either by the *thán* or by the yard, or in the expensive gold and silver cloths, by the *tolá*.

Unsewn garments.

269. It may be stated that the theory about the art of sewing not having been practised in India before the Musalmán invasion is of doubtful authenticity. The *darzi* caste is certainly considered impure, and even a Mehtar, who generally can eat food touched by an Ahír, will refuse to eat food touched by a *darzi*. But Pandits do not consider sewn clothes as in themselves an abomination. They cite the story from the Bhágwat in which Krishna on his way to the Court of King Kans gave his blessings to a *darzi* who gave him clothes, and say, "If Krishnaji used clothes made by a *darzi*, how can they be impure?" It is true that sewn clothes are not given to the idols of *Thakurji*; but that is because the *darzi* uses his tongue in moistening and his toes in twisting the thread he works with, and not on account of any intrinsic uncleanness in the art of sewing. At any rate sewn clothes are not held in abomination by the most orthodox Hindus now. Probably the general preference given to

clothes wrapped and folded round the body is more due to considerations of comfort under the climatic conditions of India than to the reasons assigned by Dr. Forbes Watson.

Garments for men and women.

270. It may be premised in general that among the fabrics which we shall describe, those of a light texture are used by the fair sex and the thicker ones by the sterner sex. The folds and pleats in a woman's dress are necessarily more numerous than in men's; and a long *sári* cloth 30 or 40 yards in length, folded round and round, and pleated liberally, is, from the point of view of grace, comfort, and hygiene, perhaps an ideal piece of dress, though it will not answer the demands of an active or busy life. It is not uncommon to find that portion of the *sári* which goes over the head made extra light as compared with the rest of the fabric. Feminine vanity would seek to display the wealth of hair, and the massive ornaments of gold and silver on the neck, ears, hair, forehead, and nose; while custom and feminine modesty would act as a counterbalancing force. The result is a semi-transparent fabric for the head, which adds the delicate tint of the fabric through which the ornaments are seen, as a further auxiliary to personal adornment, so that even a veil or a *dupattá* may be converted into an instrument of coquetry. As the Urdu poet says:—

"Áté hain apne munh pe dupatte ko tán kar;
Dete hain ham ko sharbat-i-dídár chhán kar."*

The heavy gold and silver cloths are generally used by men and not by women, as a set-off to the innumerable articles of gold and silver jewellery worn by women of a corresponding station in life.

271. We now proceed to describe fabrics woven for specific uses.

I.—Dupatta (دوپٹّہ).

Description of fabrics woven for specific uses.

I.—*Dupatta.*

272. *Dupattá* (دوپٹّہ), literally a cloth in two widths; formerly these pieces were woven narrow, and were joined alongside of one another to produce the proper width; now, however, the *dupattá* (دوپٹّہ) is all woven in one piece. This is a piece of cloth worn entire as it comes out of the loom. It is worn either round the head or over the shoulders and is used by both men and women, Hindu and Muhammadan. Standard length about 5 yards × 1¾ yards. Always has a border and sometimes also a central *chandá* or circle worked in coloured silks or *kalábatún*. If there is no *chandá*, it is called *eklai* (اکلئی). The body of the fabric (*hauz* حوض) may be either plain or figured; if the latter, it is called *Purmatan Dupattá* (پرمتن دوپٹّہ), which is used exclusively by women. The silk *dupattás* of Benares are famous all over India and some of them are also exported abroad.

Specimens examined.

273. i.—District Meerut, Nauchandi Fair, 1899—2½ yards × 1½ yard; figured; red; pure silk; price about Rs. 40; worn by women on the head.

274. ii.—District Meerut, Nauchandi Fair, 1899—3 yards × 1½ yards; silk and tasar; figured; white; 3 yards × 1½ yards; price Rs. 10.

275. iii.—District Meerut, Nauchandi Fair, 1899—made in Bulandshahr—5 yards × 1 yard; figured, white, mixed with cotton; Rs. 4.

276. iv. Benares—6¾ feet to 9 feet × 40 inches to 56 inches.—Elaborate borders; body *(hauz)* ornamented with *kalábatún* work; also plain when used by men; usually pale yellow, blue, green, and crimson; Rs. 5 to 50; sometimes mixed with cotton; worn by women, sometimes over short *sári*, but always with *lhenga* or *paijámá*.

* "She comes, with her *dupatta* pulled over her face;
She gives us to drink of the charm of her eyes, all the purer for being filtered."

277. A very thin variety (mixed with cotton), is much used by Native Christian women as *chádars*.

278. v.—District Aligarh—Large *Dupattás* 5 yards × 3 yards worn by women over the head and shoulders; *chandá* worn on the head; ends hanging, one over each shoulder at back; *kalábatún* flower work at corners; yellow and camphor colour, Rs. 8 to 25.

279. vi.—District Aligarh—*Sela Dupattá*—worn by men over shoulders, tucked round waist; ends hanging in front, 7 to 10 yards × ½ yard; plain body and borders richly ornamented with gold thread; white, yellow, and green; Rs. 30; worn in full dress; sometimes merely thrown over shoulders, with the ends hanging in front from either shoulder.

280 vii.—Benares—2½ yards × 1½ yards; men and boys; all colours; Rs. 50; pure silk.

281. viii.—Benares—2⅜ yards × $\frac{9}{16}$ yard; small men's *dupattá*, very thin gauze; almost transparent; border all round, but not coloured; ends *(pallás)* like gossamer; particularly fine piece of weaving; pure silk. Weight only 1⅞ tolas, *i.e.* about 340 grains, price Rs. 1-8-0 (specimen No. 1; see section 270.

282. ix.—Benares—*Eklái Dupattá*, *i.e.* contains no central *chandá* in body, two to three yards × 40 to 56 inches; plain with border, but of an inferior kind; mixed with cotton; Rs. 3 to 15.

283. x.—Muttra—*Sálu Dupattá*.—Worn by wealthy Hindu women; 2½ to 3 yards × 1½ yards; border flowered or embroidered; yellow, green, blue or red, Rs. 12 to 200 (expensive specimens contain *kalábatún* work). The name is from the Persian word *sail*, flood, with reference to the length of the fabric and the soft undulations it presents under a current of air; compare the name of the fabric *Ab-rawán* (flowing water), section 565.

284. xi.—*Uparná* or *Upanná Dupattá*, Benares.—Worn by Hindu men at meals or for display when lounging out; 2 yards × 1 yard; plain white body with parti-coloured border. Weft of cotton; Re. 1 to Rs. 3 ordinary kinds. If *kalábatún*, Rs. 20 to 100. One specimen studded with gems, one of the diamonds shining out at the neck like a lady's brooch when adjusted, valued at Rs. 1,800

Modes of wearing.

285. 1—Pleat it with hand. Throw one *pallá* or end over left shoulder so as to hang in front showing the corner pattern there; then bring round back, underneath right arm, across front, and over left shoulder, so as to have the other *pallá* hanging at back, showing the second pattern. Both borders should show in front.

286. 2—Without pleating throw it over shoulders, spreading it out well on back and let the *pallás* hang free in front, one on either shoulder. Then throw right *pallá* over the left shoulder. Take up left *pallá* and so arrange it on left shoulder that one corner hangs in front and the other on back. This mode is informal and is never used on occasions of ceremony or in full dress.

287. 3—Pleat and throw over back of neck, *pallás* hanging in front one from either shoulder. This may be used on visits of ceremony.

288. xii.—Jhánsi. A silk border of *dupattá*, intended to be applied to an ordinary *dupattá* without borders. Inner edge in gold thread, *kairi daur* (*i.e.* small shawl pattern), with white *bútis* on blue ground. A beautiful specimen of textile work (Specimen No. 2).

289. xiii.—Jhánsi.—A *Dupattá* border similar to xii; width 2⅛ inches; inner edge *bel kangúrádár* بیل کنگوردار (balustrade pattern); main pattern, yellow tigers, two and two facing each other, tail erect, on blue ground (Specimen No. 3).

II.—Sárí or Sárí. (ساري or ساڑي)

290. *Sári*, probably so called because it covers the entire body *(sárá badan)*; the gender on account of its invariable association with feminine garments. Mode of wearing:—Hang the breadth on left side from waist to ankle, and hold this with left hand; with right hand work the body of the fabric round waist, giving one or two turns according to length

II.—*Sári.*

of *sári*; then pleat a little and hang the pleats evenly in front so as to set off the pattern; also tuck the upper portion of the pleats under the folds so far obtained so as to secure the portion already worn; then take the *sári* over right arm and shoulder; leave it fairly loose over shoulders, and pass it under left arm; then take up the end or *pallá* or *ánchal* (in *sáris* this is the term most in use), and throw one corner over left shoulder, and leave one corner hanging free in front on left side. The loose portion at back of neck may be drawn up at will to cover the head like the hood of a cloak. Young ladies would generally have their heads thus covered, while those past 25 or 30 would leave their head uncovered. It is also a mark of respect to cover the head. This mode of wearing will explain why in some *sáris* one end is not ornamented at all while the other is gorgeously ornamented in both corners (the first end is of course entirely hidden in the folds); also why only one edge (the lower) contains an elaborate border, for in fact it serves the purposes of a flounce. Standard length and breadth 4 yards to 7 yards × 1⅛ to 1½ yards. The body of the *sári* is sometimes ornamented with patterns. The *Dakhni Sáris* (of Gwalior and further south) worn in Bundelkhand, are more ample than those of Upper India.

291. The only occasion on which *sáris* may possibly be employed by men is when they use the fabric as a *dhoti*, but in that case the fabric would cease to be termed a *sári* and be called a *dhoti*.

Specimens considered.

292. (i).—Meerut District—5 yards × 1 yard; used by Khatri, Bengali, and Baniyá women and imported from Benares; both plain and figured; red and yellow colours; pure silk, as well as mixed with Tasar, Rs. 5 to Rs. 100.

293. (ii).—Bundelkhand *Sáris*, often worn with this variation on the method described above, that the lower pleats are tucked up between the legs behind like the *káchh* (काछ) of a *dhoti*: Bundelkhand women of the lower classes expose their ankles and the calves of their legs.

294. *(a)*—Jalaun specimens—10 yards × 1¼ yard, 8 yards × 1 yard, 5 yards × 1¼ yard, and 4 yards × 1⅛ yards, plain, with well-worked border; colours red, green, blue, yellow, and purple; warp sometimes coarse and weft fine, but generally both threads uniform; both pure, and mixed with cotton; Rs. 25 to Rs. 125.

295. *(b)*.—Jhánsi—*Sári* borders; blue *Sári*; borders inside and outside, two white stripes on dark-blue ground; then red and yellow stripes with patterns; border pattern, a series of white peacocks worked on blue ground, each alternate peacock looking backwards. All silk; good finish (Specimen No. 4). Width of border two inches.

296. *(c)*. Karwi—*Dakhni Sári*, worn by Maratha or Muhammadan women: 8 yards 6 inches × 44 inches, indigo-blue body of cotton; with a 3 inch wide border of silk of close texture; the *pallás* are of cotton but ornamented so as to imitate silk patterns; red and yellow predominate in the border pattern—price Rs. 5 (Specimen No. 5). Imported from either Benares or Jhánsi. The border is characteristic.

297. (iii).—District Sháhjahánpur—5 yards × 3 to 3½ feet; figured; gold and silver work; colours various; generally pure silk, but sometimes weft of cotton; price Rs. 10 to Rs. 15 usually, but runs up to Rs. 105 in selected articles.

298. (iv)*(a)*.—District Aligarh—5 to 6 yards × 1¼ yards, plain body, but ornamented *pallás* white, yellow, red, green, and cream colours; body of *tasar* and silk; *pallás* and corners of *kalábatún*, Rs. 5 to Rs. 15.

299. *(b)*.—Another kind of *Sári* of ordinary quality; only borders of silk, but these of good quality; general description as above, Rs. 3 to Rs. 8.

300. (v).—District Muttra—About 1¼ yards × 1 yard; worn by high caste Hindu ladies; plain; yellow, green, blue, or red; pure silk; Rs. 7 to Rs. 50.

301. (vi).—District Allahabad—16½ feet × 45 inches; borders elaborate; body ornamented with *kalábatún* work, also with flower spangles; in some cases plain; pale yellow, green, crimson; pure silk, from Rs. 15 to Rs. 100; mixed silk and cotton, lower price; ornamentation not uniform all over piece, but of good quality in the parts that show conspicuously on the person. Imported from Benares.

302. (vii).—Benares—5 to 7 yards × about 2 yards; plain with blue border except at part intended to cover waist; also flower patterns in silk; red or any colour except white, which is only worn by widows; pure silk; from Rs. 10 to Rs. 500.

303. (viii).—Benares—A brown red, fine check *sári* 8¼ yards × 1 yard 5 inches, body of cotton; but both *pallás* (15 inches) of silk; and border (2½ inches) of silk. *Pallá* of lighter red, striped with gray; in the border are four stripes of zig-zag patterns. Price, Rs. 4-5-0; worn by married women.

304. (ix).—Benares. A very expensive *sári* worked in gold, 7 yards × 1 yard 5 inches; body worked in heavy *kalábatún*, peacock pattern (*Murela-dár*), with border 3½ inches, in close-worked *kalábatún*; inner edge *kanguradár bel* of *genda* (marigold) flower worked in with a creeper, Rs. 200 to Rs. 500. No *pallás*, but an expensive *pallá* would probably be added before it is worn (Specimen No. 6).

305. (x).—District Azamgarh—Ladies *sári*, 6 yards × 40 inches; warp cotton, weft silk; plain body, cream coloured; gauze texture; border ⅞ inch, black and white stripes with gold thread stripes, *pallás* similar but unequal, one *palla* 2½ inches, and the other 7½ inches; price Rs. 4 (Specimen No. 7).

306. (xi).—District Azamgarh—A similar ladies' *sári*, but Bengáli form (*Pácha Pát* with a second border a foot inside of the first; in other respects like x., manufactured in Mau Azamgarh (see Specimen No. 8).

307. The larger *Dakhni Sáris* sometimes extending to a length of 20 yards, are also called *Pátuls*.

And *Pátuls*.

III.—Dhoti *(including Pitambar).*

III.—*Dhoti* including *Pitambar*.

308. The *Dhoti*, a piece of cloth usually worn by Hindu men, indeed universally worn by them, if we except those who have adopted Musalmán and European styles of dress. It is sometimes worn by Hindu women, but in their case it would be both wider and longer. The *Sáris* and *Pátuls* worn by women *à la dhoti* have already been mentioned. By Muhammadan men of the lower classes, the *dhoti* is sometimes worn (most frequently in undress), but generally Muhammadan women avoid it.

309. Modes of wearing.

(a) Upper classes.—Hang the *dhoti* by the width, from the waist downwards, leaving loose about two feet of length towards the right side (hanging down), and the greater part of the length towards the left. The left portion is now wrapped round the back and doubled over in front, and the upper edge is so twisted and tucked in as to fasten the piece on the body. Now tuck the shorter end between the legs and fasten it at the back; this is the *káchh*. The longer end is now pleated along its width and the pleats are fastened at the top in front, the lower end being left hanging. The pleats will show off the patterns of the *pallá*.

(b) Lower classes.—Same until the first *káchh* is tied; then the pleats given to the longer end along its length, and a second *káchh* is carried over the first to the back. Or, the pleats made as in *(a)* and the lower end carried to the back.

310. Sometimes a girdle is worn, but it is invariably hidden away under the folds.

311. The *dhoti* is somewhat differently ornamented according to the mode in which it is intended to be worn; but this rule applies only to the superior class of article. Standard length, 5 yards × 1¼ yard.

Specimens considered.

312. (i).—District Jalaun, 5½ yards × 1¼ yards and 4 yards × 1 yard; plain and with ornamental border; red, black, green, blue, and purple; pure silk *dhoti* from Rs. 25 to Rs. 50 (ornamented with *kalábatún* in *palla*); mixed with cotton, Rs. 4 to Rs. 15. Imported from Jhánsi and Benares.

313. (ii).—District Muttra. A high caste *dhoti* for men and women, 3 yards × 1¼ yards; plain; colours various, yellow, green, blue, and red; pure silk, imported from Murshidabad; Rs. 2-8-0 to Rs. 10.

314. (iii).—Jhánsi—A *dhoti* border woven in blue silk covered with gold thread 2½ inches wide, peacock pattern in gold; inner edge *kángúradár* (Specimen No. 9).

315. (iv).—Benares—5 yards × 1½ yards; plain, with border of purple or fancy work; white, cream or dark-brown; from Rs. 3 to Rs. 25; pure silk.

316. Benares—*Pitambar* or *Pitambari* is a very superior class of *dhoti*, worn on festival days, and at meal time by better class Hindus, both boys, men, and women. Always of pure silk throughout, and generally of a pink, yellow, or safflower colour. It is much affected in the picturesque Sáwan popular festivals. The bigger *pitambar* pieces of safflower colour are worn as *sáris* by women in the swinging festival, and are referred to in this connection in the Bárámásá Rádhiká:—

"Sakhi, Sáwan ki rit ái,
Sukhya hindole jhule;
Pahere kusum rang sári
Jhule Rádhiká pyári."

which may be translated:—

Sáwan, dear, must have its due;
See Sukhya already on the swing;
Clad in folds of safflower hue,
Behold the loved one of the ring,
Radha, merrily, merrily swing.

Pitambars, when worn as *sáris*, may have an ornamented floral pattern in the body; but worn as *dhotis*, the body is invariably plain. In both cases there are generally rich borders in coloured silk or *kalábatún*.

317. (v).—Benares.—A *pitambar dhoti* for juveniles, 3 yards × 14 inches; brilliant pink colour, inclining to purple; all silk; border in silk, 2 inches; one *pallá* 1 foot wide, in gold *kalábatún* (false) with green and red silk; lines of black relieved by false silver thread; other *pallá* 18 inches, of which 4 inches unwoven; the rest yellow silk, to simulate gold thread, price Rs. 3 (Specimen No. 10).

318. (vi).—Benares—*Pitambari dhoti* of large size, for men; 4½ yards × 45 inches, colour more subdued than in v, and body more substantial, all silk; dark-red; with border 1¾ inches; a mere pistachio-green band separates the *pallá* (7 inches) from the body: tasar silk; price Rs. 4 (Specimen No. 11).

319. (vii).—Benares.—*Pitambar dhoti* 5 yards × 1½ yards; yellow; worn at religious rites and holy bathings; plain; all silk, Rs. 125.

320. (viii).—Jálaun.—*Pitambar* worn as a *sáfá* or turban—manufactured in Benares—10 yards × 1⅜ yards, or 5½ yards × 1¼ yard; plain or ornamented; red, black, green, blue, and purple, with *kalábatún* ornaments; prices, superior quality, Rs. 25 to Rs. 50; inferior, Rs. 5 to Rs. 15.

321. (ix).—Aligarh.—*Pitambar* worn as *sári* by women; imported from Benares and Azamgarh; 4½ yards × 24 inches to 35 inches; plain body, but elaborate *kalábatún anchals* (corners), Re. 1 to Rs. 25. In some instances mixed with cotton.

IV.—Mukta, Kora, and Sania.

322. Allied to the *dhotis*, *sáris*, and *pitambars* which we have considered, are *Muktá*, *Kora*, and *Sania*. We have seen that *Pitambar* may be used as a *sári* or a *dhoti*, and in fact a *sári* may be occasionally used as a *dhoti*. Now the *dhoti* is often required for Hindu religious ceremonials, and the fact that ordinary silk is obtained by killing the worm inside the cocoon is a hindrance to persons who scrupulously believe in the sacredness of all forms of life and act up to that belief. Even the taking

IV.—*Muktá, Kora, and Sania.*

of an insect's life might be *hatyá* (murder) in the eyes of a devout *bráhman*, and hence the invention of the fabric known as *Muktá*. It is made from the silk called *muktá* already described (section 136), which is obtained after the moth has pierced the cocoon and escaped alive. The silk is inferior, but the fabric is highly prized by Gujrátis and orthodox Hindus. The pieces are woven ready for use, either as *dhotis*, *sáris* or kerchiefs.

323. The *Kora* (=simple or plain) fabric is a kind of *pitambar*; only it is not called *pitambar* because it does not contain the *pallá* or *kinára* (border); the small line on the border does not count as *kinára*. It is invariably woven in pieces ready for *dhotis*.

324. The *sania* is a *tasar* cloth woven for the specific purpose of being made into *dhotis* or *sáris*. It is made in *tháns* for this purpose, but the fabric is used for nothing else.

Specimens considered.

325. (i).—*Muktá* or *Ratiyá*, district Allahabad; imported from Bengal; used for *dhotis*, *sáris*, and kerchiefs; all sizes; plain; colours, *kháki*, yellow, and red; generally pure silk (of pierced cocoons); Rs. 2 to Rs. 8.

326. (ii).—*Muktá*—Benares—3 to 4½ yards × 17 inches, to 35 inches; women's pieces 8½ yards × 40 inches; price, Rs. 1-8-0 to Rs. 10.

327. (iii).—*Kora*—Allahabad; imported from Murshidabad; used as *dhoti* 12 feet to 15 feet × 36 inches; plain, all colours; pure Bengal silk, increasing in popularity; price, Rs. 4 to Rs. 6.

328. (iv).—*Kora*—Benares—5 yards × 36 inches, other particulars as above; Rs. 6 to Rs. 12 for men's *dhotis*; Rs. 10 to Rs. 8 for women's *sáris*.

329. (v).—*Sania*—Benares—originally made of tasar in Bengal, but now made in Benares. In *tháns* of 40 to 50 yards × 1 yard, for *dhotis* and *sáris* only; sold at 12 annas per yard.

V.—Border and end-pieces.

330. In the fabrics hitherto mentioned, we have had occasion to refer to silk borders *(kanára* or *kanári* or *kinári)* and ornamental end pieces *(anchal* or *pallá)* with a body of cotton. In those cases the fabric was all woven in a piece. It may, however, happen that these *kanáris* or *anchals* may be woven by themselves and joined on to *sáris* and *aupattas*, sometimes to *shamlas* or *sáfás*. The *dhoti* or *dupatta* need not necessarily be of another material. Both may be of silk. Still there is obvious convenience in weaving these ornamental pieces separately, as in that case they afford a larger choice to the weaver in the selection of his or her patterns and trimmings. In Jhánsi the best stuffs woven are these borders, and a considerable number of them are also woven in Benares. We will proceed to describe a few borders from Benares.

V.—Border and end-pieces.

331. (i).—Border of gold *kalábatún*, woven with silk warp, but in such a way as to entirely hide the warp, and show only a fabric of gold. Two green silk stripes near edges, called *Mothrás*. The pattern is *Lahariádár*, *i.e.* zigzag. Width, 2½ inches. (Specimen No. 12.) Price, Rs. 2-4-0 per tola.

332. (ii).—Border of gold *kalábatún* mixed with gold *bádlá*, entirely hiding the silk as in (i). Black stripes *(mothra)*; pattern diagonal check *(ára-chárkhánáj ál*, or *Iláyecha jál)*. The *jál* consists in the fact that the pattern forms closed figures, inside which the ground is filled in; gold ground in this case, but it might have been some *buti* or other ornamentation (Specimen No. 13). Width, 2¼ inches. Price Rs. 2 per tola.

333. (iii).—Border of magenta silk with wavy angular zigzag pattern *(Lahariá)* in gold *kalábatún*, black stripes *(Mothrá)* near edge. Width 1½ inches (Specimen No. 14). Price, Rs. 2-8-0 per yard (so quoted because of the larger quantity of silk).

334. (iv).—Border of an old pattern popular in the Court of Wájid Ali Shah, King of Oudh. Very fine *Mothrá* of black silk and gold thread ; edge of red silk and gold thread ; body of border composed of gold and silver *kalábatún* checks, the red silk being entirely hidden away. Price, Rs. 2 per tola. Width 1¼ inches (Specimen No. 15).

335. (v).—Border with *chashmá* pattern, *i.e.* consisting of figures like the following, , in gold *kalábatún*, with the pink silk ground showing. Width, 2½ inches. Price, Rs. 3 per yard (Specimen No. 16).

336. (vi).—Border of silver *bádlá*, with blue silk, *moṭhrás* or edge stripes ; pattern, *Laharıádár* (zigzag undulations). Width, 1⅛ inch. No silk shows except in the *Moṭhrás*. Price, Re. 1-4-0 per tola. (Specimen No. 17.)

VI.—Turbans.

337. The turban is of course exclusively men's head-dress. The wearing of turbans is somewhat declining with the advent of western tastes and fashions, but this applies to ordinary turbans. Silk turbans, worn on special occasions or by special classes of people, are not so much affected by the new ideas. The most general term for this class of head-dress is *Pagri*, but strictly speaking, the following classes of turbans are recognised in silk —(1) *Pagri*, (2) *Mandíl*, (3) *Shamla*, (4) *Addha*, (5) *Sáfá* or *Amámá*,—not to mention the *sela* which is a species of *dupatta* sometimes worn on the head as a turban by men. Turbans are always tied round the head from right to left in front and from left to right at the back ; *i.e.* against the motion of the hands of a clock.

VI.—Turbans : different kinds.

The *Pagri* is either tied with the hand of the wearer himself *impromptu* or by a professional *pagri-band* on a model head. The modes of tying are various, and the fabric woven also varies according to the mode intended. The Márwári *Pagri* is tied so that the side bands are twisted almost into thin strings, and the standard measure is 10 yards × 8 inches ; the bands cross in front and at the back ; colour either pink, yellow, or dark red. The Batti-*Pagri* is a sort of turban affected by the military classes, Thákurs or Muhammadans who are *Ahl-i-Saif* (*i.e.* people of the sword) ; in this the band is twisted tight along its entire length ; and it is tied over a cap ; standard measure 25 yards × 10 inches. The *Pagri* or band tied over English hats is also woven in silk in Benares, and needs no further description ; standard measure 2 yards × 7½ inches.

(1) *Pagri.*

338. A silk *Pagri* usually contains *kanáris*, *i.e.* lines or bands, along its length. Two *kanáris* are taken as a matter of course ; a *Pagri* with two only would be called plain. In addition to these there may be three, five or seven *kanáris*, either in coloured silk or in *kalábatún*.

339. The term *Mandíl* is sometimes synonymous with *Pagri*, but is often applied to a separate band in silk and *kalábatún* tied over a *pagri* ; this *Mandíl* is, however, slowly dying out. The *Pagri* of ceremony is tied as a symbol of succession when the head of a religious brotherhood or organization dies and another is elected or nominated in his place. In eastern seminaries of the old type it is also the symbol of a Degree of learning ; the disciple is *in statu pupillari* until the dignity of a *Pagri* is conferred on him by the hands of his master.

(2) *Mandíl.*

340. The *Shamla* is an expensive turban with *bádlá* work, and is usually tied straight. The bands do not cross each other, and as a rule are very little twisted, if at all. It does not contain a *Kub*, *i.e.* the crown raised over the head, or a *Laṭṭu*, *i.e.* a slight pointed prominence closely tied on the crown. The *Addha* is generally a smaller *Shamla*. Standard measure of a *Shamla*, 5 yards × 1 yard. The width is much pleated in tying, but care should be taken not to twist the *salái* or *bádlá* lines, when the *Shamla* is *saláidár*.

(3) *Shamla.*

(4) *Addha.*

341. The *Sáfá* or *Amámá* is the least formal of turbans. It is less long and broader than the other kinds, and is in favour with learned Muhammadans, who affect simplicity in dress. It is tied in a mass on the head; either both ends are tucked in, or one end is left hanging (as in a *chaprási's sáfá*), or both ends are carried from the back over the shoulders and tied below the chin (*taht-ul-hanak*), an old Arab custom recommended by strict Muhammadans, especially on important journeys. The variety know as *Sáfá Mandíla* has *kanáris* of *bádlá* or *kalábatún* along its length like a *mandíl*. Standard measure, 7 to 10 yards × 1 to 1¾ yards.

(5) *Sáfá.*

Specimens considered.

342. (i).—*Mandíl*—Jalaun—20 yards × 1 yard; plain or with gold thread stripes; red; from Rs. 20 to Rs. 50. Imported.

343. (ii).—Muttra *Pagri*; particulars not given nor specimen received; yellow, green, blue, and red; of pure silk; imported from Benares.

344. iii).—Sháhjahánpur—*Pagri*—used in weddings by the lower classes, 6 yards to 20 yards long × 12 inches wide; plain; all colours; some pure silk, some mixed with cotton; price from Re. 1 to Rs. 10.

345. (iv).—Benares—*Sáfás* of pure silk, worn usually by Panjábis; 20 to 30 yards × 2 yards (Panjábi *Sáfás* are long); white, red or yellow, with a border; black in religious processions; Rs. 100.

VII.—Caps.

346 Caps are worn exclusively by men, and are gradually coming more and more into public favour. The silk caps of these Provinces may be divided into five classes.

VII.—Caps.

347. (1).—*Topi Dopalli*, or consisting of two *pallás i.e.* two pieces sewn together, of shape as in the illustration. A light inexpensive cap worn by all classes. Length of each *pallá* 10 inches × height 6 inches. Woven in pieces of six or eight caps, which are afterwards cut and made up. Body often of cotton, and border of silk.

(1) *Dopalli.*

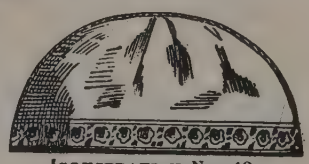


Illustration No. 43 (Section 347).
SHAPE OF DOPALLA CAP.

348. (i).—Cotton body, light and thin, with border, 1⅛ inches in width, *kangurádar*. Red *kangurá*; blue *báti* (Specimen No. 18). Price, 10 caps per rupee.

349. (ii).—Thin white cotton body, texture of gauze; border of yellow silk, with lozenge pattern (called *bel Angrezi*), 4½ inches wide; price 12 caps per rupee (Specimen No. 19).

350. (iii).—White cotton body; thin but figured with thick flowers woven in white cotton; border of beautiful white silk, ⅞ inch wide; price 8 caps per rupee (Specimen No. 20).

351. (iv.)—White cotton body with 8-petalled flowers in gold *kalábatún* and little dots in white; border of white silk, 1 inch wide; price 4 caps per rupee (Specimen No. 21).

352. (v).—White cotton body, with 6-petalled flowers in green silk and gold *kalábatún* alternately; border of white silk; 1 inch wide; price 4 caps per rupee (Specimen No. 22).

353. (2).—*Topi Kishtinumá* (boat-shaped); the ordinary shape, stiff or limp. The limp cap can be folded, and resembles, except in material, an English felt hat with the brim off; generally a mixed fabric, silk and cotton. The stiff cap is called the Meerut Cap, generally made of black velvet (imported) with silk patterns worked by hand.

(2) *Kishtinumá.*

354. (vi).—Specimen in Nauchandi Fair, 1899—*Kishtinumá* cap, mixed silk and cotton; white and yellow; figured; 23 to 24 inches in circumference, and about 6 inches high; annas 12 to Rs. 5.

355. (vii).—Muttra District—Meerut cap of velvet; beautifully embroidered with silks of ten different colours and shades, the yellow predominating; price annas 1 .

356. (viii).—Karwi Sub-division, Bánda District.—Four specimens of velvet caps embroidered in the Doáb *(antar-bed)*; the flowers in this are worked in silks of various colours, but are not joined to one another in a running pattern, as in the Muttra specimen above (Specimen No. 24 is an entire cap, showing the shape; Specimens Nos. 25, 26, and 27 are cap rims showing embroidery).

357. (3)—*Ṭopi Piṭáridár*, a high stiff cap, with a soft pleated crown at the top made in Benares; often ornamented with *kalábatún* work.

(3) *Pitáridár.*

358. (4).—*Chaugoshiá Ṭopi* (four-cornered) worn by better class Musalmáns and Káyasths; pyramidal in shape, but not ending in a point; crescent and other ornamentations at corners; price Rs. 2 to Rs. 15, silk and *kalábatún*.

(4) Chaugoshiá.

359. (5).—*Pach-paliá Ṭopi* made in five pieces, though the different pieces are woven in one fabric *ad hoc;* sometimes called the Panjábi cap; a pyramidal cap ending in a point, highly ornamented with *kalábatún;* worn under *Sáfás*, never by itself; made in Benares; price from Rs. 5 upwards.

(5) *Pach-palia.*

VIII.—Kerchiefs and *Angochhas.*

360. The vernacular term *Rumál* (Persian *ru*, face and *málidan*, to rub or wipe) is difficult to translate with reference to the various uses to which the article is applied, except perhaps with the word kerchief. It may be carried in the hand by a high-born *parda* lady attached to her *ṭatwá* or tiny silk handbag, and ornamented with all sorts of gold and silver trinkets; then it is a handkerchief in the true sense of the word. It may be carried by men, hanging on the left shoulder and used to wipe the hands or face; then, too, it is a handkerchief. It may be as big as a towel, and thrown over both shoulders by men, the ends either hanging loose or tied in a knot in front; it then serves the purpose of a *gulúband* or muffler. In the case of children it is tied round the neck as a neckkerchief, or round the waist for mere show. It may be used by women much as the 18th century tucker was used in England in Addison's time.

VIII.—Kerchiefs

361. The *Angochha* I have also classed with the kerchief. It is almost exclusively used by Hindus. The term is derived from *Ang*, body, and *Gochha*, a root meaning to bind. In towns it is wrapped round the waist by the men as a bathing dress, but the rustic use of the article is, besides this, as a turban or *dupattá*. The rustics, however, do not use silk *Angochhas*, so that our silk *Angochha* is merely a sort of towel handkerchief.

And *angochhas.*

362. The *Rumál* is always square-shaped, but varies widely in size from 25 inches to 3 yards; the *Angochha* is generally oblong, and thicker in texture than the *Rumál.*

Specimens considered.

363. (i).—Benares *Angochhas* of various sizes, generally not more than 2½ yards in length; both pure silk and mixed with cotton; plain and with borders; white, cream, and dark-brown; used both as towel and handkerchief by men (Hindus), price from Re. 1 upwards.

364. (ii).—Jhánsi—*Rumál* carried by Baniyás in hand or on shoulders; 2 feet 5 inches × 2 feet 5 inches; plain cotton body with border of silk lines, 1⅛ inches; white or coloured; 10 annas each (Specimen No. 28).

365. (iii).—Meerut district—*Rumáls* similar to those of Jhánsi; 30 inches to 20 inches square, 1½ yards square; Rs. 1-8-0 to Rs. 10.

366. (iv).—Jalaun district—*Rumáls*, silk or silk and cotton; 1½ yards square, various colours, plain and figured; Rs. 5 to Rs. 50. Generally imported from Benares, worn over the shoulders.

367. (v).—Budaun district—*Rumáls* of three sizes, 18 inches square, 27 inches square, and 32 inches square; shades of yellow, pink, and green; silk or silk and tasar; nine annas, Re. 1, and Re. 1-2-0.

368. (vi).—Aligarh district—*Rumáls* 30 inches square and 1 yard 10 inches square; pure silk or silk and tasar; border embroidered with silk or *kalábatún* Turanj work (Kashmir pattern); white, yellow, and cream; Rs. 2 to Rs. 10 and Rs. 8 to Rs. 25 (large size, with *kalábatún*); tied round neck. Imported from Benares.

369. (vii).—Sháhjahánpur—2 or 3 feet square; silk or silk and cotton; all colours; plain and figured; carried by men, and tied on head by women; Re. 1 to Rs. 6.

370. (viii).—Benares—*Rumál* ornamented with flowers and bordered with lace; worn by boys and girls round neck; 2 yards × 2 yards; sky-blue colour; all silk; Rs. 50.

371. (ix).—Benares—*Rumál* ornamented with peacock pattern in green silk; with running floral device (*Jáli*) of gold *kalábatún*; 1½ yard square; gold *kalábatún* border; worn by men on neck; Rs. 40. Similar Specimen 2 yards square, Rs. 80.

372. (x).—Benares—*Rumál* worked in silk in imitation of the Krishnápáli cotton kerchief of Madras; 2 yards 15 inches × 45 inches; a check of *kalábatún* in body; borders in gold and silver threads.

373. (xi).—Benares—Kerchief (*couvre-chef*) for the head—called *Qasába* or *qasáwa*, 25 inches square; used by women tied from the front with the ends knotted behind, the hair being gathered in the knot; as it is worn doubled up diagonally, only half of piece is ornamented; with just a corner on the other side which is turned up; Rs. 2 to Rs. 5; mostly exported to Bombay and Madras.

374. (xii).—Benares—Neckerchief, 2½ yards × 10 inches, worn by men; all silk; sometimes *kalábatún* ornaments; Rs. 2 to Rs. 10.

IX.—Shawls.

375. The shawl needs no description. The pure silk shawl was probably invented to meet the case of a luxurious nobleman of a court like that of Oudh who was dressed from top to toe in silk, and to whom a woollen shawl would be out of keeping with his general apparel. Now pure silk shawls are generally worn by ladies only.

IX.—Shawls.

Specimens considered.

376. (i).—Jalaun district.—Woollen body with silk patterns; various colours; 3 yards × 1½ yards; worn by men and women; Rs. 10 to Rs. 100. Imported.

377. (ii).—Sháhjahánpur district.—Pure silk; worn by women; all colours; 3 yards × 1½ yard; plain and figured; Rs. 10 to Rs. 50.

X.—Lungi, Khes, and Fabrics used as Mantles.

378. There are a number of fabrics which are simply wrapped over the head and shoulders by men and women. We proceed to describe those that are produced in the silk-weaving establishments of Benares.

379. The *Lungi* is in its origin a cotton check, and as such may be wrapped round the body both above and below the waist. The silk *lungi* imitates the check of the cotton article, but is only used for the upper part of the body, generally by men. The Benares silk *Lungis* are mostly exported to Bengal.

X.—*Lungi.*

380. (i).—Benares—*Lungi*; 2½ yards to 3 yards × 1½ yard, all silk; body check; border of *kalábatún*; both *anchals* of *kalábatún*, 15 inches wide; *do rukhi*, *i.e.* has no reverse side; may be worn on both sides; one side blue, the other scarlet; Rs. 70.

Khes.

381. The *Khes* is in its origin a cotton fabric, check and floral, woven in Rámpur Native State, the pattern being either in relief or showing as in damask. This is also imitated in silk.

382. (ii).—Benares—*Khes*; pure silk; light green ground; border of gold *bádlá*; 3 yards × 1½ yards; Rs. 65; worn by both men and women.

Rám-námi.

383. The *Rám-námi* is a fabric much used by the Hindus in their religious rites; it is wrapped over the shoulders by men and women for *pujá-pát*. Its efficacy consists in the fact that it contains in fine Hindi letters the names Sita Ram, Sita Ram, repeated over and over again.

384. (iii).—Benares—*Rám-námi*; silk body; words in silk or *kalábatún*; 1¼ yard × 2½ yards; price Rs. 50 to Rs. 300.

And Pamri.

385. The *Pamri* is used by women and children, generally amongst Hindus.

386. (iv).—District Jalaun—*Pamri*, 3½ yards ×1⅛ yard, or 3 yards ×1⅛ yard, or 2½ yards ×1 yard; pure silk or silk and cotton; with *kalábatún* ornamentation in border; red, black, green, blue, and purple, Rs. 2 to 10. Imported from Benares.

XI.—Petticoats.

XI.—Petticoats.

387. Of silk petticoats woven in a piece there are three kinds, the *Lhenga*, the *Ghágrá*, and the *Sáyá*. The piece is generally woven the proper length and width for the purpose, but of various fabrics, such as *Sangi* or *Ghalta*. The ordinary *Sangi* or *Ghalta thán*, however, would be sold by the yard, whereas a *Lhenga* or *Ghágrá* or *Sáyá* piece would be sold entire. It has one border, *viz.* that which hangs at the lower edge of the skirt. The upper edge is turned down and sewn to form a *Nefa* to receive the string or girdle which ties it to the waist, where the dress is puckered up. Ordinary Hindu women wear the *Sári* which has a skirt of its own; but certain castes of them wear the *Lhenga* or *Ghágrá*. The *Ghágrá* differs from the *Lhenga* in that it is more ample and is generally in use among Márwári women. The *Sáyá* is said to be intermediate between the two, and to be worn by Ayahs, &c. Musalmán women wear divided skirts, or *Sáris*, except the lower classes.

Lhenga.
Ghágrá.
Sáyá.

388. The *Peshwáz* is women's substitute for men's jáma and includes bodice as well as skirt. The whole fabric for it is, in the more showy kinds, woven in a piece, but it has still to be cut and sewn before it is ready.

Peshwáz.

389. (i).—Azamgarh—*Ghágrá*-piece of *Ghalta*, striped; for Káyasth women; 4 yards 15 inches × 35 inches; red with white lines across *Lhenga*—Lower border 3⅛ inches; consisting of central green stripes bounded by yellow bands in numerous stripes; mixed silk and cotton, but the former predominates; Rs. 4 (Specimen No. 29).

390. (ii).—Azamgarh—*Lhenga*-piece of *Ghalta* marked somewhat like *Sangi*; 13 feet 7 inches × 2 feet 8½ inches; striped; broad narrow stripes, golden yellow varied with green, on a purple ground; *zanjír* (chain) pattern in the stripes; warp of silk; weft of red cotton; price Rs. 5-8-0 (Specimen No. 30).

391. (iii).—Benares—*Kamkhwáb Lhenga* border—*Lhenga* of red silk; 4 yards × 35 inches; *turanj* pattern in gold *kalábatún* on body; border of 3¾ inches also in gold *kalábatún*; *Jál*, *Ashrafi báti*; edge *kairi daur*. Price of *Lhenga*, Rs. 100. (Pattern of border and *Turanj*, Specimen No. 31.)

XII.—Bodice.

392. Bodice-pieces *(Choli-khan* or *Choli-khand)* are checks woven so as to produce the particular kind of ornamentation in *kalábatún* required in this article of dress. The piece after being woven is cut into its component parts and made up ready for wear. The sleeves (covering half the upper arm) have a single star, *turanj* or other single pattern, such as will show off the ornaments of gold and silver worn lower down on the arm, while the pattern in front would be in circlets, allowing for a liberal amount of puckering up. Width 20 inches to 25 inches; length 45 inches; colours green, red, or lapis lazuli; price from Rs. 7 to Rs. 19.

XII.—Bodice pieces *(choli-khan).*

393. The *choli-khans* of Benares, like the *Banárasi dupattas*, are famous all over the country, and female pilgrims would generally make a point of including them in their purchases, to be carried away as mementos of their visit to sacred Káshi.

394. (i).—Allahabad district—40 inches × 18 inches, colours various; sometimes shot silk; prices Rs. 2 to Rs. 10.

XIII.—Bridal Veils.

395. A fabric is woven for bridal veils called *chira makna.* The *chira* is strictly the bridegroom's veil and the *makna* is the bride's; but the two are exactly the same and inter-changeable. The custom is confined to Musalmáns of the higher classes and old ideas, and the bridegroom's veil, at any rate, is tolerated under the custom of child marriages still fairly rife under the influence of the social environment of the Hindus. It is a very thin, almost transparent, fabric of red silk, 25 inches × 4 yards; price about Rs. 5. A great deal of length is wrapped round the bridegroom's turban *(Shamla)*, or the bride's head, and the veil hangs in front to about the knees. It must be remembered that there are two other veils besides, one of fresh flowers, and over it, one of *bádlá;* the *chira makna* comes over all.

XIII.—Bridal veils *(chira makna).*

XIV.—Kamarbands and Belts.

396. The silk *kamarband* woven in Benares is called *paṭka;* it is 6 yards to 10 yards long by 20 inches wide; a very light fabric, with a border which shows in weaving, and highly ornamented ends or *anchals*, which are left hanging in front; colours various; Rs. 10 to Rs. 50.

XIV.—*Paṭka* or *kamarband.*

397. Belts *(peṭi)* are similarly woven of silk; the web is of a strong substantial twisted silk; about 50 inches × 8 inches to 10 inches; but the length would be reduced and edges turned down as required in preparing it for wear; *kalábatún* ornamentation; clasp of gold or silver, but covered with silk to render it in keeping with soft apparel; price Rs. 5 to Rs. 10 not including clasp. Sometimes the *peṭi* is worn over the *paṭka.* The only article of dress admissible over the *peṭi* or *paṭka* is the *chauga.* The *peṭi* and *paṭka* are used by men only.

Peṭi (belts or sash).

XV.—Paijámas.

398. *Paijámas* or trousers worn by men (generally Musalmáns); each leg is cut not in two pieces as in English trousers, but in one piece, the seam being on the inner side; the waist edge is turned down and sewn for the reception of a girdle or *izárband*, which is also separately woven in a tape of varying width, maximum 8 inches. The *paijáma* piece is woven in a fabric in which the different pieces are separated, for being cut and sewn.—*Kamkhwáb paijáma* Rs. 25.

XV.—*Paijámas.*

399. A species of ladies' *paijámas* (for Musalmáns) are woven to order for Native States like Bhopál; these are really divided skirts, each leg having an

enormous width, extending in the most sumptuous pieces to as much as 600 *kalis* (triangular pieces) trailing on the ground, and carried by three women attendants. One pair of such *paijámas* of 50 or 60 *kalis* would cost about Rs. 60, but these are generally made to order only.

XVI.—Men's Coat Pieces.

400. Some silk garments corresponding to coats and waistcoats are also woven in Benares. The principal classes are :—

XVI.—Men's coat pieces.

401. (i).—*Angarkha;* woven in a piece, with the following distinctive parts:—

Angarkha.

Two *astins* (sleeves).

One *parda* or breast-piece of an elongated circular shape, sewn on to left side by Hindus, and right side by Musalmáns.

One *kiwári*; a piece complementary in shape to the *parda*, and sewn on to the right side by Hindus, and left side by Musalmáns. The edges of the *parda* and the *kiwári* meet in wearing, but are not sewn together; there is a silk tying string or loop and *ghundi* (button) of *kalábatún* at the top and bottom which joins them in wearing.

One *pithalla*, or back-piece, to which the *parda* and the *kiwári* are sewn on either side.

Six *kalis* or gussets, triangular pieces, reaching down to the skirt of the *Angarkha*, below the knees.

Four *baghl* pieces or bands that go under the arms.

The body portion of the *Angarkha* is the *choli;* the skirt is the *dáman*. Price Rs. 50 to Rs. 300.

402. (ii).—*Kafni* (literally shroud-piece); a robe worn by Musalmán faqírs; a simple sheet-fabric in the centre of which is made a slit through which the head is passed; it has generally no arms; it is open at the sides, and rests on the shoulders; 1¼ yards × 3 yards.

Kafni.

403. (iii).—*Chauga* or *Abá* (cloak for men).

404. (iv).—*Sadri* (sleeveless jacket for men).

405. (v).—*Salúka* (men's jacket with sleeves). In both (iv) and (v), the series of *ghundis* and *tukmas* (silk buttons and loops), which run in a line down the middle front, lend themselves to endless ornamentation, also the two crescent-shaped pockets below and the two vertical slits for breast-pockets above; but these ornamentations are added subsequently by the wearer.

Salúka.

406. (vi).—*Kurta*, a shirt-like light garment worn by men and by Musalmán women of the Western districts; the skirt ends are left hanging outside the trousers and are ornamented with borders. The *kurta* is usually worn as an undress at home; for full dress, a *Sadri*, *Angarkha*, or *Achkan* (which is not woven in whole pieces), and *Chauga* or a combination of some of these would be worn over the *kurta* in the case of men and a *dupattá* in the case of women.

Kurta.

407. (vii).—The *kót* (coat) and *váskót* (waistcoat) are mere imitations of English fashions; they are sometimes made in silk, but they need not detain us here.

XVII.—Coat Borders, &c.

408. We spoke of *sári* and *dupattá* borders as being woven separately. Similarly borders for men's coats, *angarkhas*, &c., are separately woven, and we will examine a few specimens.

XVII.—Coat borders.

409. (i).—A border 1⅝ inches wide; red silk ground; gold *kalábatún* ornamented with silk patterns of various colours (red-green of two shades and dark violet). Such parti-coloured ornamentation is called *Mínákári;* price Rs. 3 a

yard. A *thán* of these is usually 4 yards × 28 inches, so as to include 12 borders side by side (Specimen No. 32).

410. (ii).—A *mínákári* border *phúldár* (flower pattern); purple silk fabric; border-ground in gold *kalábatún;* flowers in black and pink silks and silver *kalábatún;* 1¼ inches wide, Rs. 2-9-0 a yard (Specimen No. 33).

411. (iii).—A *Kamkhwáb* border, 1¾ inches wide; ground work of pink silk; *genda* (marigold) pattern in gold *kalábatún;* Rs. 4 per yard (Specimen No. 34).

412. (iv).—A *Kamkhwáb* border in *mínákári* work; red silk fabric; border in gold *kalábatún;* flowers in green, violet, and red silks; *kangúra* edge; texture close; a fine specimen; two inches wide; Rs. 6 per yard (Specimen No. 35).

413. (v).—A border of gold *kalábatún* on brown-red silk ground; 2 inches wide; subdued colour; good texture; Rs. 4 per yard (Specimen No. 36).

414. (vi).—Border of gold *kalábatún* on heliotrope ground; *genda* pattern; 1¾ inches wide; Rs. 4 per yard (Specimen No. 37).

415. (vii).—Border of silver *kalábatún* on black silk ground; 1⅛ inch wide; pattern *Khájúredár; kangúra* edge; Rs. 2 per yard (Specimen No. 38).

XVIII.—Shoes.

416. The upper portions of shoes and entire slippers are sometimes woven in silk, usually to order only.

XVIII.—Shoes.

417. We have so far confined ourselves to wearing apparel. We now pass on to articles of other kinds.

XIX.—Bedcovers, Coverlets, &c.

418. These are the fabrics intended to be quilted and used for bedcovers, cushions, &c., and those not quilted but used in furnishing rooms, such as *pardas*, &c. These have no standard length or patterns, and are usually woven to order. A brief mention alone will be sufficient.

XIX.—Bedcovers, coverlets, &c.

419. (i).—*Razái*, for being quilted and stuffed with cotton, &c., for the cold weather; about 1½ yard × 2¾ yards. The lower classes sometimes wear them out of doors, but in polite society they are only worn in undress in the house.

Razái.

420. (ii).—*Leháf*, bed-quilts or coverlets, 2½ yards × 3 yards generally; quilted.

Leháf.

421. (iii).—*Masnads*, intended to be stuffed and used as a *daïs* on which persons of great dignity would sit with cushions ranged on three sides, the front being left open. The stuffing is either cotton, *sembal* (the fibre produced by *Bombax heptaphyllum*) or feathers; the feathers of the *surkháb* (sheldrake or brahminy duck) are esteemed valuable for the purpose.

Masnad.

422. (iv).—*Andi-ki-chadar;* sheet coverings for the bed, woven in Partábgarh from the silk of the Eri silkworm, 4½ feet × 9 feet; not sold. Two specimens; coarse No. 96, and thin, No. 97.

&c.

423. (v).—*Masehri* or mosquito curtains.

424. (vi).—*Pardas* or curtains; these are sometimes stuffed for use in the cold weather, but generally used plain.

425. (vii).—*Takiye-ká-giláf*, or pillow cases.

426. (viii).—*Khánposh*, a covering for trays on which viands are sent as presents on formal occasions according to the custom of Indian society.

427. (ix).—*Zer-Andáz*, a piece of cloth (spread on the carpet) on which a *huqqa* with its *pechwán (huqqa* snake of a superior kind) is placed. It consists of a circular piece on which the bottom *(penda)* of the *huqqa* would be placed, with a long piece of fabric *(bisát)* which would carry the *pechwán* to the smoker.

SPEC. No. 6
SECS. 217 & 304

SPEC. NO. 18
SECS. 227 & 348

SPEC. NO. 31
SECS. 231 & 391

SPEC. NO. 36
SECS. 217 & 413

XX.—Fans, &c.

428. The following articles used by noblemen for show may also be mentioned :—

XX.—Fans, &c.

429. (i).—Fans *(pankhas)*; these are generally woven of a round shape and afterwards so prepared as to be easily folded.

430. (ii).—Umbrellas called *chhatars;* these are the umbrellas of dignity, "royal" umbrellas.

431. (iii).—Coverings for sword sheaths.

432. All these are ornamented in silk or *kalábatún* patterns, and it is the necessity of producing suitable patterns that indicates their being specially woven instead of being cut out of an ordinary *thán*.

XXI.—Game Cloths.

433. The cloths for the two favourite Indian games, chess (*shatranj* شطرنج) and *pachísi* are also woven in silk; they serve the purpose of boards.

XXI.—Game cloths.

XXII.—Trappings.

434. Articles connected with the horse, elephant, *pálki* (palanquin), or carriages are also made in silk.

Trappings.

435. (i).—*Chár-jáma,* or the old-fashioned native saddle, with raised pommels in front and behind; the girths would also be of silk.

436. (ii).—*Zín-posh,* or saddle cover, goes over the *Chár-jámá* seat, and the ends hang on all sides; secured round by silk strings.

437. (iii).—*Gardani* or horse cloths.

438. (iv).—*Háthi-ka-jhúl,* coverlets for the cushions of an elephant, if cushions are used. If a *hauda (howdah),* or *Amári* is used, the *jhúl* is joined to that structure and hangs as a skirt. The *Amári* differs from the *hauda* in having a canopy or roof.

439. (v).—Coverlets for *pálkis, bahelis, raths,* and other kinds of carriages.

CHAPTER VIII.

Silk Fabrics described :—those woven for general purposes.

Fabrics woven for general purposes.

440. In this Chapter will be described the fabrics that are woven as *tháns*, not for a specific purpose but for general uses. Such fabrics are usually sold by the yard, and the use to which they are destined depends on the purchaser within certain limits, for even here usage confines the use of particular fabrics as suitable for some group of purposes within which lies the choice.

I.—Brocades.

I.—Brocades *(kamkhwábs)*.

441. Benares *kamḳhwábs* (kincobs) ór brocades are not only famous throughout India, but a considerable amount of trade in them is done with Europe and other parts of the world. Indian taste allows them to be used for every kind of wearing-apparel, upholstery, and furniture, and Indian luxury presses it into uses where its use is distinctly unsuitable. In fact Indian imagination is so impressed with its beauty, splendour, and elegance that the ordinary derivation of the word supposes that a man could not even dream of it who had not seen it (*Kam* = little, scarcely, *khwáb* = dream). The poet Insha's punning lines suggest a variation on this idea :—

> "*Gar kahín shab ko nazar ḳákum o sanjáb áyá.*
> "*Háth mal mal ke sahar ho gai, kam ḳhwáb áyá.*"

If perchance I saw kákum or sanjáb by night, I was left rubbing my hands in despair until it was morning; then came kamkhwáb (or for the last three words the *double entendre* would also imply " and I got no sleep").

442. Apart from its more cryptic meaning, the poet here gives precedence to kamḳhwáb over the kákum or sanjáb fabrics celebrated in Persian poetry; these were only seen by night, but the climax was reached when the kamkhwáb came and was seen by the superior light of day, when there was no deception !

443. A whole monograph could be written on Benares brocades alone, such is the variety in which they are produced. As they are the most valuable of the fabrics of these provinces, they will be considered in detail with reference to numerous specimens.

444. Kamḳhwábs (or kimḳhwábs) are also known as *zar-baft* (gold-woven), and *mushajjar* (having patterns). If a kamkhwáb has a ground work of gold threads and a creeper or other pattern of silver thread, it is called *táshi* : "ground work" does not mean original ground work ; for there is always a silk web to hold together all the heavy kalábatún work : the term is here used in opposition to the running pattern. A kamḳhwáb thán is woven with from three to seven layers of warp threads *(tipara, chaupara,* &c. to *sátpara)*. The standard thán is 4 yards × 30 inches.

Specimens considered.

445. (i) District Aligarh. Benares kamḳhwáb ; thán 4½ yards × 30 to 35 inches ; warp of tasar and weft of silk ; thán Rs. 10 to Rs. 200 ; used for coats, achkans, trousers and lhengas.

446. (ii) Karwi Sub-Division. Benares kamḳhwáb ; thán 4 yards × 26 inches ; red ground of silk, with oval dots ¾ inches in length in gold kalábatún ; somewhat old-fashioned ; Rs. 15 going up to Rs. 500 ; used for lhengas by women and angarkhás by men (Specimen No. 39).

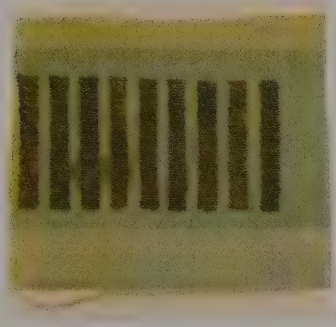
447. (iii) Karwi Sub-Division. Old Benares kamḳhwáb reshmi, about 30 years old, from an angarkhá in a pawnbroker's shop ; pattern *masúri búta (i.e.*

SPEC. NO. 38
SECS. 221 & 415

SPEC. NO. 55
SECS. 233 & 468

SPEC. NO. 47
SECS. 215 & 460

SPEC. NO. 61
SECS. 230 & 477



SPEC. NO. 49
SECS. 212 & 462

lentil-shaped circles, of same size as lentils) in gold *kalábatún;* original width of thán about 23 inches; valued when new at about Rs. 35 per yard.

448. (iv) District Meerut. *Kamkhwábs* from Chanderi (Gwalior territory) and Benares, thán 4½ to 4¾ yards × 30 inches; used for chaugás, angarkhás, sadris, and paijámas, by both Hindus and Musalmáns; Rs. 5 to Rs. 500 per *thán.*

449. (v) District Jalaun. Mixed silk and cotton kamḳhwáb; thán 4 yards × ⅝ to ⅞ yard; price Rs. 4 to Rs. 10. Imported; used for angarkhás by men, and for paijámas and lhengas by women.

450. (vi) District Allahabad. Inferior silk and cotton body; red; kalábatún work; used as in Jalaun: thán 3⅓ yards to 4½ yards × 22 inches to 27 inches; from Rs. 10 upwards; imported from Benares.

451. (vii) Benares. Kamḳhwáb; pure strong silk of inferior quality; with gold and silver kalábatún entirely covering the silk; patterns:—flowers, scenery, peacocks and other birds; used by the wealthy for coatings and for horse and elephant trappings; thán 4 yards × ¾ yards; Rs. 500 to Rs. 700.

452. (viii) Benares. Another kind; used for trousers, curtains, &c; and specially called *zar-baft;* thán 4 yards × ¾ yards; Rs. 500 to Rs. 700.

453. (ix) Benares. Kamḳhwáb *jangla;* gold kalábatún on black silk; pattern supposed to represent wild (jungle) flowers and creepers; thán 4 yards × 30 inches; Rs. 150. (The kalábatún is *rási, i.e.* with very thin coating of gold; similar thán of superior gold kalábatún would be about Rs. 250) (Specimen No. 40).

454. (x) Benares. Kamḳhwáb *chinia pot makhmali;* large spaces of the groundwork of dark heliotrope silk are visible; there is a silk velvety running pattern (hence *makhmali*), and the silk is chinia; the flowers (*bútis*) are of superior gold kalábatún, wide apart; thán 4 yards × 30 inches; Rs 125 (Specimen No. 41).

455. (xi) Benares. Kamḳhwáb Jáldar; *ashrafi búti; rási* gold kalábatún; red groundwork of silk showing in narrow lines; thán 4 yards × 30 inches; Rs. 100 (Specimen No. 42.)

456. (xii) Benares. Kamḳhwáb mashru kalábatún; pattern *khanjari* (zigzag) to imitate mashru fabrics to be described below; gold ḳhanjari lines with red silk showing between; thán 5 yards × 30 inches; Rs. 80 to Rs. 125 according to quality of gold thread (Specimen No. 43).

457. (xiii) Benares. Kamḳhwáb míná-táshi; having flowers in silver thread, combined with red, yellow and purple silks, on a groundwork of gold threads; thán usual length, Rs. 60 to Rs. 125 according to quality of gold thread (Specimen No. 44).

458. (xiv) Benares. Kamḳhwáb mashru reshmi; pattern exactly as in xii, but there is no kalábatún here; ground and pattern all yellow silk; I should have called this fabric Amru, as there is no kalábatún, (see sec. 471), but the trade insists on calling it kamḳhwáb; thán usual size; Rs. 50 (Specimen No. 45).

459. (xv) Benares. Kámḳhwáb váskat; both ground-work and straight creeper pattern in yellow silk; with flowers in silver thread; thán usual size; Rs. 60 (Specimen No. 46).

460. (xvi) Benares. Kamḳhwáb iláyecha, yellow silk with gold thread, iláyecha pattern; thán Rs. 175 (Specimen No. 47).

461. (xvii) Benares. Kamḳhwáb jáldár, with *kalgi* pattern; gold thread and *mína* work in pink and green silks; red ground; thán Rs. 250 (Specimen No. 48.)

462. (xviii) Benares. Kamḳhwáb saláidár, *i.e.*, long stripes; close textured gold thread, on bluish green ground of silk; thán Rs. 225; cut diagnonically for use in paijamás (Specimen No. 49).

463. (xix) Benares. Kamḳhwáb váskat, in closed creeper patterns; with large flowers and small flowers alternating, in gold thread; the váskat patterns and the ground in red silk; thán Rs. 90 (Specimen No. 50.) Cf. xv.

464. (xx) Benares. Kamḳhwáb ára-táshí; diagonal lines in gold thread, with flower pattern in silver thread; magenta ground; thán Rs. 125 (Specimen No. 51).

465. (xxi) Benares. Kamḳhwáb váskat ará gojar; váskat or *brochè* pattern in red silk; centres of flowers in silver thread on silk ground; centipede pattern in silver thread; thán Rs. 60 (Specimen No. 52).

466. (xxii) Benares. Kamḳhwáb Kalgi Iláyecha with mothra or silk lines, half an inch apart; ground-work in dark purple; kalgi, Iláyecha pattern in gold thread; thán Rs. 50 (Specimen No. 53.)

467. (xxiii) Benares. *Kamḳhwáb jangla váskat;* black ground with *brochè* pattern (váskat) in same colour; irregular wild-flower pattern (jangla) in gold thread; thán Rs. 50 (Specimen No. 54).

468. (xxiv) Benares. Kamḳhwáb árí-bel phulwar; diagonal lines in gold thread, with large flowers worked in coloured silks after the manner of embroidery; groups of small flowers in silver thread; thán Rs. 150 (Specimen No. 55).

469. (xxv.) Benares. Kamḳhwáb mína, búṭi phúl; silver thread pattern; sprays of flowers in silk; groundwork of silk does not show; thán Rs. 70 (Specimen No. 56).

470. (xxvi) Benares. Brocade known as *tamámi*, one yard wide; length according to order; stripes of four double threads of gold kalábatún and a similar number of red silk threads; used for hangings as cloth of gold, also for borders in garments (Specimen No. 75).

II.—Amru.

471. *Amru* is a fabric woven like kamḳhwáb but without kalábatún, and is sometimes classed with kamḳhwáb (see kamkhwáb xiv). *Kalábatún* patterns could sometimes be added to special order; maximum number of layers of warp in the loom, 5. This fabric is often used by people whose purse does not allow them to use costly kamḳhwábs; a lining is considered to be essential in dresses made of this fabric. Like kamḳhwáb it is also a speciality of Benares.

II.—Amru.

472. (i) Benares. Flower pattern; mixed silk and cotton; used for paijámas and petticoats, and other articles of attire; Musalmáns are partial to it; thán 4 yards × ¾ yard; Rs. 25.

473. (ii) Benares. Flowered stripes of four colours, one after another, pale yellow, pink, cream and pistachio-green; warp of tasar and weft of cotton; thán 4 yards × 20 inches; Rs. 2 (Specimen No. 57).

474. (iii) Benares. Amru jangla jámewár; rambling floral pattern, with turanj *búṭis*; ground in kháki brown, with patterns in green, red, yellow, white, and dark blue; all silk; thán 4 yards × 27 inches; Rs. 16 (Specimen No. 58)—a good specimen.

475. (iv) Benares. Amru jangla kalgi ka; regular pattern of various flowers, large and small, in a variety of colours, pistachio-green ground, thán 4 yards × 27 inches; Rs. 30 (Specimen No. 59).

476. (v) Benares. Amru búti chameli, *i.e.* conventional *chameli* pattern in red, white, and green silk, on dark kháki ground; mixed cotton and tasar ground; thán 4 yards × 27 inches; Rs. 11 (Specimen No. 60).

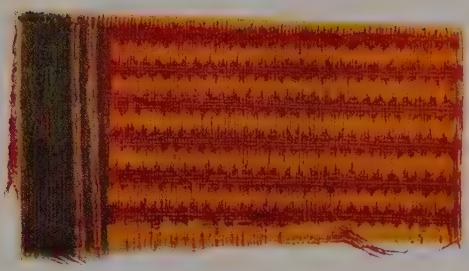
477. (vi) Benares. Amru búti jamewár; pattern like the bushes in old conventional pictures; red ground of silk; thán 4 yards × 27 inches, Rs. 12 (Specimen No. 61).

478. (vii) Benares. Amru of three *búṭis;* pattern consists of two different kinds of flowers and a spray of flowers in succession worked in varying colours; thán 4 yards × 27 inches; Rs. 12 (Specimen No. 62).

479. (viii) Benares. Amru, of thick texture; rambling creeper pattern; flowers in red, pink, violet, and black; creeper stalks in yellow; ground dark-green; all silk; thán 4 yards × 27 inches; Rs. 20 (Specimen No. 63).

SPEC. NO. 65
SECS. 219 & 481

SPEC. NO. 127
SECS. 232 & 585



SPEC. NO. 68
SECS. 213 & 487

SPEC. NO. 130
SECS. 228, 229 & 588

SPEC. NO. 76
SECS. 216 & 491

SPEC. NO. 142
SECS. 214 & 613

480. (ix) Benares. Amru with red ground, and isolated *búṭis* in various colours, green, white, violet and yellow; ali *búṭis* uniform; thán 4 yards × 27 inches, Rs. 11; specimen No. 64.

481. (x) Benares. Amru reshmi kamḳhwáb or Sádá, *i.e.*, plain kamḳhwáb pattern; cream silk ground, with running floral pattern of same colour, worked as in damask; a characteristic specimen; thán 4 yards × 30 inches; Rs. 13; specimen No. 65.

III.—Sangi.

482. *Sangi* is a fabric with a wavy line (*ḳhanjari*) running along its width produced by the necessary manipulation of the weft thread. It has been already explained in the chapter on weaving (sections 186–8, 199) how the wavy line of sangi is produced differently from that of mashrú. Sangi derives its name from the fact that two warp threads are in weaving this fabric treated together (*sang* = together) as one thread. It may be further explained here how the wavy line of sangi differs from that of *gulbadan*. It will be found on close examination that each individual thread in the wavy line of sangi stands out like a long stitch on the fabric, while in gulbadan this is not the case, but the apparent line is really made up of points. In other words gulbadan texture is closer and finer, and therefore more expensive. The characteristic form of sangi is green or yellow warp (and consequently green or yellow ḳhanjari) with red weft. This cloth is a great favourite (when mixed with cotton) with Musalmáns of the higher classes, but its use is general among all classes.

III.—Sangi.

Specimens considered.

483. (i) District Jalaun. Silk mixed with cotton or tasar, or pure silk; warp coarse, and weft fine; used by Hindu and Musalmán women for lhengas and paijámas respectively; thán $4\frac{1}{2}$ yards × $\frac{7}{8}$ yard; pure silk Rs. 20; mixed Rs. 2 to Rs 8; imported.

484. (ii) District Allahabad. Used for paijámas by Musalmán women, and by men at weddings; sometimes kalábatún work; imported from Benares and Azamgarh; some tháns have a plain smooth under-surface; the gloss is imparted to the cloth by a process known as *kundi*, described in the chapter on weaving; tháns $13\frac{1}{2}$ feet × 27 inches to 36 inches; Re. 1 to Rs. 25.

485. (iii) District Azamgarh. Sangi pachrangi phúldár; the characteristic *ḳhanjari* runs throughout, but there are stripes of various colours running at right angles to the *ḳhanjari*, and a few *búṭis* in silver kalábatún; mixed with cotton, produced at Mubárakpur (district Azamgarh); thán 9 yards × 26 inches; Rs. 14 (Specimen No. 66).

486. (iv) District Azamgarh. Sangi sabz zard, *i.e.* yellow *ḳhanjari* on green ground, silk and cotton; thán of $4\frac{1}{2}$ yards × 26 inches; Rs. 3-4-0 (Specimen No. 67).

487. (v) District Azamgarh. Sangi surḳh zard; yellow *ḳhanjari* on red ground; silk and cotton; thán $4\frac{1}{2}$ yards × 26 inches; Rs. 3-8-0 (Specimen No. 68).

488. (vi) District Benares. A mixed sangi used for men's paijámas and for carriage decoration; sometimes checks in addition to *ḳhanjari*; 4 yards × $\frac{3}{4}$ yard; Rs. 25.

489. (vii) Karwi Sub-Division. A light red sangi with *ḳhanjari* in yellow produced in a peculiar way, *viz.* by dotted lines, hence called gulbadan waza (pattern); thán 13 feet 6 inches × 2 feet 8 inches; Rs. 3-8-0; imported probably from Benares (Specimen No. 69).

490. (viii) District Benares. A sangi of more than ordinary brilliancy, with *búṭas* in silver kalábatún; thán $4\frac{1}{2}$ yards × 36 inches; Rs. 6 (Specimen No. 70).

491. (ix) District Azamgarh. Sangi naqshi, used for lhengas and paijámas; series of *khanjari* stripes, two large and four small; parti-coloured; 8 páunris used in weaving; 9 yards × 26 inches; Rs. 8 (Specimen No. 76).

IV.—Gulbadan.

IV.—*Gulbadan.*

492. The *gulbadan* (literally *body like the rose*) is a light-texture fabric with a wavy line pattern like that of *sangi*. The line is, however, produced differently in the two fabrics, and the difference has already been explained under *sangi*. It may be added here that gulbadan warp threads are, in true gulbadan, dyed partially as in the case of mashru (see chapter on weaving, sections 186–8), but this test does not apply to "Banárasi gulbadan," which is an imitation and cheaper than the real article. In any case two warp threads are not in weaving treated as one, as is done in *sangi*.

Specimens considered.

493. (i) District Meerut. Plain gulbadan; pure silk, or mixed tasar or cotton; used for skirts and paijámas by all classes of people; generally imported from Benares and Azamgarh; thán 4½ yards × 27 inches; Re. 1-8-0 to Rs. 10.

494. (ii) District Jalaun. Similar to those from Meerut; used by Hindu and Musalmán women; thán 4½ yards × ¾ to 1½ yard; price, pure silk Rs. 20; tasar mixtures, Rs. 2 to Rs. 8.

495. (iii) District Allahabad. Similar; both pure and mixed tháns from Benares; coloured lines; occasionally kalábatún pattern; not so much used now as formerly, having been beaten in the race by the cheaper and more showy sangi; tháns 13½ feet × 27 inches; Rs. 2 to Rs. 15.

496. (iv) District Budaun. Mixed cotton and silk gulbadans of the false (imitation) kinds; dark-red and yellow, or dark-red and white, interspersed with flowers or foliage in green silk; thán 4½ yards × 33 inches; Re. 1 to Rs. 8.

497. (v) District Aligarh. Warp of silk and weft of tasar; used for paijámas and lhengas; 4½ yards × 1 yard; Rs. 2 to Rs 6.

498. (vi) District Sháhjahánpur. Silk or silk-and-cotton; straight patterns, sometimes also checks and silver thread work; 4½ yards × 1 yard; Re. 1-4-0 to Rs. 6.

499. (viii) District Benares. Cotton warp and silk weft*; stripes and checks, but no kalábatún; used for curtains; 4 yards × ¾ yards; Rs. 25.

500. (viii) District Benares. Silk warp and cotton weft; red ground, with white lines, not quite *khanjari*, but tending to a wavy form; thán 4½ yards × 35 inches; Rs. 3 (Specimen No. 71).

501. (ix) District Benares. Obtained in Karwi; pure silk; *asli gulbadan* (as opposed to imitations), with warp threads dyed as in mashru; red ground, and white wavy pattern; specimen No. 72; thán usual length; Rs. 10.

502. (x) District Benares. Obtained in Karwi; pure silk; like (ix); only dark-green ground with white *khanjari*; used in wedding garments; thán of ordinary size; Rs. 10 to Rs. 25 (Specimen No. 73).

V.—Mashru.

V.—Mashrú.

503. The peculiar method of dyeing mashrú warp threads preliminary to weaving has been fully explained in the chapter on weaving sections 186–8). The word *mashru* means "*permitted*," and refers to the prohibition in Moslem ceremonial law of the use of pure silk by men except in war or in the form of narrow borders of dresses. To meet this prohibition, a *fatwa* (decision of the learned) was obtained to the effect that since pure silk *(harír)* was prohibited, fabrics containing silk and some other

* So the District Report; but probably this is an error: the warp is of silk in mixed fabrics.

material were permitted *(mashrú)* for men, and hence the invention of this fabric for the men of Islám. The prohibition of pure silk does not apply to women, and therefore Musalmán women may in strict conformity with the letter of their law wear the most sumptuous fabrics of silk.

504. These mixed fabrics are often woven with great taste and skill, and the production of minute *ḳhanjari* patterns in them is a matter on which the weavers pride themselves.

505. (i) District Azamgarh. Mashrú Khadde-dár; ground purple red, interspersed with whitish spots of irregularly defined outline (*khaddá*); 6 yards × 26 inches; used for men's paijámas by Musalmáns generally; Rs. 5 (Specimen No. 74).

506. (ii) District Jalaun. Imported from Allahabad. Mashrú used by women for lhengas; stripes; silk and cotton; 40 yards × 1 yard; Rs. 5 to Rs. 12.

507. (iii) District Benares. Used for men's trousers; stripes and flower patterns; 4 yards × 3½ yards; Rs. 25.

508. (iv) The Agra report mentions a *garbi* (mixed) fabric as consisting of silk and cotton in the proportion of 1 to 2, but gives no further particulars. Mashrú is evidently referred to.

VI.—Ghalta.

VI.—Ghalta.

509. As kamḳhwáb is the speciality of Benares, *ghalta* is the speciality of several towns in the Azamgarh District, *e.g.*, Mubárakpur, Mau, and Khairábád. Ghalta pieces are also woven in Benares, but the superior finish and the great variety of the ghaltas woven in Azamgarh still practically identify ghalta industry with that district. The name ghalta is from the Persian *ghaltídan*, to roll, probably with reference to its smooth glazed surface, one method of producing which is to pass the fabric over or under hot cylinders which are rolled. The ghalta cannot be more pithily described than by the term usually applied to it by visitors to these provinces; *viz.* Azamgarh satinette; it is a mixed cotton and silk fabric, but in the completed thán, the upper surface is so well pressed and calendered that none of the cotton shows there; while the back shows very little silk and almost all cotton. The characteristic pattern on a ghalta is checks bounded with one, two or three lines, and the portion between the lines in one direction may be filled in with silk of a different colour from the rest of the fabric, so that there will be a combination of checks and stripes. Other patterns, however, are found. In wedding ceremonies yellow stripes on red ground would be the time-honoured colour. In plain ghaltas pink is the favourite colour for ladies and boys, and *makhaniá* (pale yellow) for men. For small children *sauzard* (golden yellow) is fashionable. No apology is needed for examining ghaltas in detail with reference to numerous specimens, as we did in the case of Benares kamḳhwábs, as the Ghalta occupies a most important position in the provincial silk industry. The standard thán is 9 yards × 26 inches, and it is generally, like mashrú, of mixed silk; it can be used for coats, angarkhás, sherwáni achkans (which differ from ordinary achkans in having no *kalis*, see section 401), fatúhis (sleeveless jackets), and numerous other garments for men and women. These matters, therefore, will not be referred to in considering the specimens, unless there is any variation in a particular specimen; it will also be assumed that the ghalta is produced in the Azamgarh district unless the contrary is stated.

510. (i) Ghalta ḳhánedár; square checks in black and light blue lines; white ground; Rs. 8 (Specimen No. 77).

511. (ii) Ghalta khánedár; oblong checks; three lines and one line alternately; line in *ládámi* (buff) colour; ground cream; fine soft texture; Rs. 7-8-0 (Specimen No. 78).

Variation in a ground-colour of lapis lazuli.

512. (iii) Ghalta khánedár (checks); ground dark blue, stripes of green and violet; lines of yellow silk; Rs. 10 (Specimen No. 79).

513. (iv) Ghalta phúldár; patterns of simple green flowers on red ground, slight shot-silk effect; two *páis* (see section 197) used in weaving; 9 yards × 27 inches; Rs. 9 (Specimen No. 80).

Variation, similar flowers on dark blue ground.

514. (v) Ghalta dháridár; stripes only, alternating with lines; ground dark blue; stripes red, green, and violet; Rs. 9 (Specimen No. 81).

515. (vi) Ghalta khánedár; oblong checks prominently marked by red lines; light green ground; a subtle effect is produced by two faint yellow lines on each side of every second red line; Rs. 9 (Specimen No. 82).

516. (vii) Ghalta saláidár; stripes breadthwise, cream-coloured silk; groundwork of entirely cotton texture; Rs. 7 (Specimen No. 83).

517. (viii) Ghalta reshmi khánedár; of silk throughout; no cotton; cream ground; double black lines, both lengthwise and widthwise, forming little checks $\frac{3}{8}$ths of an inch square; 9 yards × 35 inches; Rs. 16 (Specimen No. 84).

518. (ix) Ghalta khanjaridár after the pattern of Sangi cloth; stripes of khanjari pattern in light yellow, broad and narrow alternately, with bluish stripes between; suitable for lhengas and boys' clothing; $4\frac{1}{2}$ yards × 26 inches; Rs. 2-12-0 (Specimen No. 85).

519. Several variations are made, differing in the colours of the stripes and the size of the khanjari; but the size and price of the thán remain about the same.

520. (x) Ghalta sádá; plain, without any pattern; beautiful glazed surface; thán 18 yards × 28 inches; Rs. 24-12-0; specimen No. 86, including 20 sample pieces of different colours, shades of red, green, gray, yellow, and cream.

521. (xi) Ghalta mothradár, *i.e.* having Mothra pattern, wide lines with decorative ornament in white and red, black ground; Rs. 8; (Specimen No. 87.)

522. (xii) Another ghalta mothradár; but the lines in this occupy much more space on the surface of the fabric; they are pink, of pure silk, while the groundwork is a mixture of silk and cotton, also pink; Rs. 5 (Specimen No. 88).

Several variations on this.

523. (xiii) A variation on the above, where the mothras are crossed by single lines, producing checks; white ground and deep yellow lines; Rs. 4-8-0 (Specimen No. 89).

524. (xiv) Ghalta sufaid; plain white; 18 yards × 28 inches; superior quality; Rs. 22 (Specimen No. 90).

Inferior quality; specimen No. 91. Two similar ghalta specimens from Benares; 9 yards × 28 inches; 1st quality Rs. 15; specimen No. 92 (superior to specimen No. 90); 2nd quality Rs. 8; specimen No. 93 (inferior to specimen No. 91).

525. (xv) Ghalta khánedár phúldár; flowers of white silk enclosed in checks of black lines; ground white; fabric cotton except flowers (Specimen No. 94).

526. (xvi) Ghalta saláidár reshmi; all silk; white stripes on white ground; Rs. 8; (Specimen No. 95) *cf.* (viii.).

Another specimen from Benares, $1\frac{1}{2}$ tolas per rupee.

527. (xvii) Karwi Sub-Division. Ghalta of checks of double black lines on ground silver-gray, inclined to yellowish; Rs. 10. Imported from Azamgarh (Specimen No. 98).

528. (xviii) District Jalaun. Mixed ghaltas, with patterns; $4\frac{1}{2}$ yards × $\frac{5}{8}$ to $\frac{7}{8}$ yard; Rs. 2-8-0 to Rs. 6; imported through Cawnpore.

529. (xix) District Allahabad. Pure silk and mixed ghaltas; stripe or check patterns and plain with borders; Rs. 5 upwards.

530. (xx) District Sháhjahánpur. Ghalta, ground fabric white cotton; stripes of yellow silk, running along its length; made in Benares; 9 yards × 27 inches; Rs. 6 (Specimen No. 99).

VII.—Satin or Atlas.

VII.—Satin or Atlas.

531. *Atlas* is the Indian satin, but the term "*sátan*" (corrupted from English) is also applied, and sometimes specialized to a thicker form of the fabric. This fabric is always substantial, *i.e.* never so thin or netted as to be semi-transparent; more of the weft showing on the upper surface than of the warp. *Pát* (see chapter on threads, section 143) is generally used in this fabric; twisted *chinia* is also used in heavy satins, and untwisted *chinia* in light ones. The smooth glossy surface is characteristic, and has already been referred to under Ghalta. It may be plain or have a floral pattern, but kalábatún ornamentation on it is rare.

532. (i) Benares. Atlas phúlwar *(brochê)*, deep yellow; thán 4 yards × 35 inches; Rs. 40. The pattern is imitated from a piece of English-manufactured silk; the fabric is useful for women's paijámás, kurtás or lhengas and men's angarkbás.

533. (ii) District Jalaun. Atlas plain; 50 yards × 1½ yard and 50 yards × 1½ yard; pure silk; Rs. 40; mixed with tasar Rs. 19 to Rs. 30. Imported.

534. (iii) District Budaun, Atlas 9 yards × 26 inches; mixed with cotton, from Rs. 5 to Rs. 8.

535. (iv) District Budaun. *Sátan;* 36 yards × 24 inches; plain; reverse side shows cotton; upper side a glossy silk surface; Rs. 36.

536. (v) Nauchandi Fair, 1899 (Meerut). Washing *Sátan* from Azamgarh; pure silk, plain; Rs. 30; 18 yards × 30 inches.

537. (vi) Karwi Sub-Division. Imported. *Sátan zari phúlwar;* bright scarlet *brochê* ground; with turanj bútas of false silver kalábatún, in the centre of which is a little work in pink, green, and violet silk; thán 40 to 60 yards × 17½ inches; price Rs. 2-4-0 per yard (Specimen No. 100).

VIII.—Chárkhánáand Súsi.

VIII.—Chárkhánáand Súsi.

538. The word *chárkhánáa* simply means a check; but the term is applied to certain silk or mixed fabrics containing small checks, usually about 8 or 10 checks in a line to an inch. The checks, in ghaltas are generally much larger. There is a *chárkhánáa* known as *súsi*, which is manufactured by Messrs. Mujtaba & Co. of Agra from original designs in their possession. *Súsi* is an ancient fabric, the name being derived from the name of the ancient Persian city Susiana (modern Shustar), just as the name of the European fabric known as *Tulle* is derived from the town of that name, capital of the Department of Corrèze in France.

539. (i) District Shábjahánpur. Chárkháná, silk and cotton, red ground with black and yellow lines crossing each other; used for lhengas by Hindu women; 10 yards × 32 inches; imported; Rs. 2 to Rs 3 (Specimen No. 101).

540. (ii) District Azamgarh. Chárkháná; ground of white cotton; check lines, white silk; texture thin, used for angás and kurtás by men; 9 yards × 40 inches; Rs. 5 (Specimen No. 102.)

541. (iii) District Azamgarh. Chárkháná thin as gauze; ground of fine white cotton threads; check lines in yellow silk; used for men's coats, angarkhás and kurtás; 9 yards × 40 inches; Rs. 6 (Specimen 103).

542. (iv) District Azamgarh. Reshmi chárkháná rádhánagri; a beautiful drab-yellow ground (semi-transparent) in pure silk, with check lines in cream coloured cotton; used for sáris or turbans, coats, or chádars (sheets); 9 yards × 40 inches; Rs. 8-12-0 (Specimen No. 104).

543. (v) District Azamgarh. Reshmi chárkháná rádhánagri chhotá kháná; minute checks; texture, colour, and uses similar to (iv); both warp and weft contain bands of cotton and silk threads alternately; more skill and labour used in weaving this than (iv), but this contains more cotton; 9 yards × 40 inches; Rs. 8-4-0 (Specimen No. 105).

544. (vi) District Agra. Súsi or chárḳháná; pure silk; small checks; green ground with white check lines, or violet ground with white check lines, or yellow ground with red check lines; 64 yards × 25 inches; fast colours, annas 15 per yard; fugitive colours, annas 13 per yard (Specimen No. 106).

545. (vii) Benares. Chárḳháná with large checks, produced by broad bands and lines alternately in white or brown or black ground; all silk; 6½ yards × 1¼ yard; price Rs. 3 per yard (Specimen No. 107).

546. (viii) Benares. Cheoli chárḳháná; soft texture; all silk; white ground; pink bands and blue lines alternately; used principally for *gots, i.e.* hems of Musalmán women's paijámas, Hindu women's lhengas, and the coats of people of both persuasions; width 47 inches; length various; Rs. 2-8-0 per yard (Specimen No. 108).

For the characteristics of cheoli, see Cheoli below, XVII.

IX.—Ḍoriya.

IX.—Ḍoriya.

547. As the characteristic pattern of the chárḳháná is a check, so that of the *ḍoriya* is stripes running along the length of the thán, *i.e.* in warp threads. The ḍoriya was originally a cotton fabric, but it is now manufactured in silk, silk-and-cotton, tasar, and other combinations. Bádlá (gold or silver wire flattened) is also introduced in specimens woven for the wealthy.

548. (i) Meerut Nauchandi Fair, 1899. Tasar ḍoriya, used for angarkhás, kurtás, and dupattás; mixed tasar and silk; from Bulandshahr; 9 yards × 30 inches; Rs. 7.

549. (ii) Meerut Nauchandi Fair, 1899. Ḍoriya reshmi; for angarkhás, kurtás, and dupaṭṭás; silk mixed with cotton; 9 yards × 1 yard; Rs. 9; from Bulandshahr.

550. (iii) District Azamgarh. A semi-transparent ḍoriya; general warp silk, weft cotton; stripes of cotton; all white; 9 yards × 27 inches; Rs. 3 (Specimen No. 109).

551. (iv) District Azamgarh. Ḍoriya reshmi Rádhánagri; weft of silk; warp of silk, except the stripe threads; narrow double stripes; the whole cream-coloured; 9 yards × 40 inches; Rs. 8; may be used for sári, turban, coat or chádar (Specimen No. 110).

X.—Giranṭ.

X.—Giranṭ.

552. This is a plain fabric of pure silk and light texture, said to be English in its origin. The bazaar idea is that *giranṭ* is an English word. A large number of *girants* are green, and that may have given rise to the name.* Compare the word *atlas* for satin; in Arabic *atlas* only means "of a sky-blue colour"; hence the frequent reference in Urdu poetry of *atlas* as being the vault of the sky.

553. (i) District Farukhabad. Three specimens; colours green, yellow, and violet respectively; warp of twisted thread, and weft of untwisted thread; thán 22 inches × 18 inches; Rs. 11; used for hems and borders of women's garments (Specimen No. 111).

554. (ii) District Jalaun. Giranṭ, used by men for angarkhás, and by women for kurtás, lhengas, and paijámás; 10 yards × ½ yard; pure silk; Rs. 40; mixed with tasar, from Rs. 19 to 30 according to width. Imported.

555. (iii) District Budaun. Used for caps, angarkhás, and women's garments by the wealthy classes; 50 yards × 17 inches; Rs. 50.

* More probably, *giranṭ* is a corruption of *grenadine*, as has been suggested to me by Mr. H. J. Bell, C.S.

XI.—Daryái.

556. Daryái is an old silk fabric. It is mentioned in the list of silk fabrics given in the *Áin-i-Akbarí* as commonly known in the Emperor Akbar's time. It is very much like girant, with a slightly heavier texture, and is always plain. A daryái thán 12 inches wide is estimated to take 480 single warp threads or 240 double warp threads.

XI.—Daryái.

557. (i) District Farukhabad. Coarse daryái; yellow colour; warp of twisted thread, weft of untwisted; 22 yards × 9 inches; Rs. 4-2-0 (Specimen No. 112).

Other colours green or red; used by Hindus in wedding ceremonies as a *paṭka* or waist-band for the bridegroom, or sheet *(chádar)* wrapped round the bride in the *bháṉwar** ceremony. It is sometimes used in funerals as a shroud. Ordinarily, it forms hems and borders for women's garments.

558. (ii) District Meerut. Imported daryái used for hems and linings; 40 yards × 18 inches; pure silk, Rs. 6-4-0 to Rs. 20.

559. (iii) District Agra. Fine daryáis are manufactured on old patterns; soft texture; all colours; pistachio-green, green, white, yellow, red, blue; length of thán various; width 9 inches, annas 5½ per yard; 16 inches, 8 to 10 annas per yard; 27 inches; 14 annas to Re. 1 yer yard (Specimen No. 113).

XII.—Iláyecha.

560. Like daryái, the ilayecha was probably introduced by the Mughals and has historical associations with Agra, where alone it is manufactured. The word is stated by the Dictionary *Ghayás* as being derived from Turkish *Alcha* or *Alácha*, meaning a striped silk fabric. This fabric differs from the ḍoriya in having a substantial texture, whereas the ḍoriya is generally flimsy. The colours are generally red, or bluish red, with white stripes. In several specimens, a slight shot effect is observed on account of blue being used in the weft and red in the warp. Prices: 18 inches wide Re. 1 per yard; 33 to 34 inches wide, Re. 1-13-0 to Rs. 2-4-0 per yard (Specimen No. 114).

XII.—Iláyecha.

XIII.—Silk Nainsukhs.

561. Silk nainsukhs are imitated from the cotton fabrics of that name and resemble them in texture. Being light, they are used by men for *kurtás, angarkhás,* and turbans, and by women for covering-sheets and *kurtis;* they are either plain or have a floral damask pattern in the same colour as the ground. A favourite with Hindus.

XIII.—Silk Nainsukhs.

562. (i) District Jalaun. Plain nainsukh, warp coarser than weft; 40 yards × 1 yard; Rs. 40; imported; pure silk.

563. (ii) District Budaun. Figured, sometimes with a stamped pattern; white ground, and floral pattern in very pale shades of yellow, pink, or green; 30 yards × 52 inches; Rs. 82; pure silk.

564. (iii) District Aligarh. Imported from Benares; ordinary and twill weaving, used for angarkhás and achkans; 10 yards × 1 yard; Rs. 8 to Rs. 12.

XIV.—Áb-rawán and other light fabrics.

565. *Áb-rawán (*literally *flowing water)* is a thin silk gauze, made of threads known as singles. It is used by men for kurtás and by women for dupattás; width 48 to 52 inches; price Rs. 2-4-0 per yard. The specimen before me is pale pink, but other colours are manufactured in Benares (Specimen No. 115).

XIV.—Áb-rawán and other light fabrics.

* This is the Hindu ceremony by which the nuptial knot is tied. It varies among the different castes, but the essential features are these:—After the arrival of the bridegroom's *cortège* at the bride's house, the happy couple are first seated *vis à vis* on a throne to receive offerings; then their garments are literally tied in a knot and they are made to walk round a central emblem seven times. This central emblem is usually a bough of the mango or other tree, and typifies fruitfulness.

Sharbati.

566. A still thinner fabric used to be made called *sharbati;* but no specimen of it is available. *Tanzeb* (silk muslin) seems also to have gone out of fashion, though cotton *tanzeb* is very commonly used for the *chikan* work of Lucknow.

Bánd.

567. *Bánd* (literally drops) is similar to *áb-rawán*, with little spots in colours usually picked out by tying a little knot in the fabric and immersing it in a dye, when the tied portion will remain the original colour, while the body of the fabric will be dyed, producing the effect of spots of undefined outlines as in cotton *chunris;* 15 yards × 35 inches; Rs. 5 per yard. This is what is known as Bandanna.

Kareb.

568. *Kareb* (corrupted from English, crape) is in all colours, and sometimes striped; 4 yards × 1 to 1½ yards; used for men's kurtas and angarkhás and women's dupattás; made in Benares.

Addhi.

569. *Reshmi addhis* reported to be manufactured in Azamgarh. The specimen before me from Azamgarh is a pale orange; plain, of very thin texture; pure silk; reported to be used for coats, &c.; 9 yards × 35 inches; Rs. 16 (Specimen No. 134).

XV.—Bádla fabrics.

XV.—Bádlá fabrics.

570. Bádlá is a flattened wire of gold or silver. The gold *bádlá* is merely gilt, as pure gold wire could not be produced fit for wearing. The following fabrics in which *bádlá* is introduced are produced in Benares:—

Tásh-bádlá.

571. (i) *Tásh-bádlá lahariadár;* zigzag pattern; warp silk; weft gold bádlá, used for a wedding robe (jámá) for the bridegroom; 4 yards × 35 inches; sold by weight, Re. 1-8-0 per tola (Specimen No. 116).

572 (ii) *Tásh-bádlá árі-bel,* in which the pattern is a diagonal *bel* or creeper; texture thick; comprising gold *bádlá*, gold *kalábatun*, and yellow silk, which does not show; Re. 1-12-0 per tola; specimen No. 117; used for *masnad* trappings and hangings.

Wálá.

573. (iii) *Wálá.* Body of thin pink silk; with narrow lines of gold bádlá and flowers in gold kalábatún; used for angarkhás, pardás and sáfás; 10 to 20 yards × ½ to 1¼ yard; Rs. 80 per thán of 20 yards × ½ yard (Specimen No. 118).

Notice that the flower or *búṭi* here is jámdáni *búṭi*, while this texture of *bádlá* and kalábatún is called *maharmád*.

Lappa.

574. (iv) *Lappa* is similar to Tásh-bádlá above, only the warp is of *bádlá* and the weft of silk. Used for wedding *jámás.*

Asári.

575. (v) *Asári.* This is a fabric in which the bádlá instead of being woven in straight lines, is interspersed irregularly. Also used for wedding *jámás.*

XVI.—Pôt Tháns and Bápta.

XVI.—Pôt Tháns.

576. Pôt Tháns are manufactured in Benares. They are expensive, consisting of silk and *kalábatún* work, but their texture is lighter than that of *kamḳhwáb*, and this constitutes the main difference between the two fabrics. Pôt tháns are also of shot silk occasionally and the gold and silver *búṭis* on them are generally large isolated flowers. Pôt tháns are used for all sorts of expensive garments, while *kamḳhwáb* is often considered too heavy for personal wear, and is generally used for pardás, hangings, trappings, and upholstery of a very sumptuous kind.

577. (i) Sádá pôt; shows the plain texture of the silk body of pôt tháns; green colour; rarely sold in this form without the addition of characteristic *búṭis*

in kalábatún; length and width various; 1½ tola per rupee (Specimen No. 119).

578. (ii) Pôt, jangla pattern, with flowers interspersed in a seemingly irregular form; ground colour grayish blue, with little flowers of raised silk in that colour; *búṭis* large and small in gold kalábatún; 4 to 7 yards × 1 to 1½ yard; Rs. 100 to Rs. 500 (Specimen No. 120).

579. (iii) Pôt, groundwork of thin light bádámi (buff) ḍoriyá (see sec. 547), with large *búṭa* in gold kalábatún; five *mína* spots in the *búṭa i.e.* spots in coloured silk, in this case dark-blue, green, and violet); 4 to 7 yards × 1 to 1½ yards; price Rs. 75 to Rs. 500 (Specimen No. 121).

580. (iv) Pôt, red ground of silk with kalgi *búṭis* near each other in gold kalábatún; size of thán as above; Rs. 75 to Rs. 300 (Specimen No. 122).

581. (v) Pôt, green ground; a line of *kalgi búṭis* and a line of *sat-pankha búṭis* alternately; in gold kalábatún; 4 yards × 1 yard; Rs. 50 (Specimen No. 123.)

582. (vi) Pôt, red fabric with large *búṭis kanghi ke phul*, and small *búṭis chunri patridár*; size of thán as in (iii); Rs. 100 to Rs. 500 (Specimen No. 124). A patridár búṭi is one that has a base as in this.

583. (vii) Pôt, light fabric; pink; lozenge figures worked out in gold kalábatún, with a three-leaved *búṭi* in the centre of each figure, also in gold kalábatún; a spot in centre of *búṭi*, of dark silk; 4 yards × 35 inches; Rs 35 to Rs. 100 (Specimen No. 125).

584. (viii) Pôt, deep orange fabric; satin finish, with *búṭis* large and small in gold kalábatún; 4 yards × 48 inches; Rs. 5 to Rs. 8 per yard (Specimen No. 126).

585. (ix) Pôt, bright pink fabric of china silk; large *búṭa jhárdár* (thick spray) in gold kalábatún; 3 yards × 1 yard; Rs. 125 (Specimen No. 127).

586 (x) Pôt, soft white silk fabric; *búṭi* gul-dáoodi (chrysanthemum) in gold kalábatún; 4 yards × 30 inches; Rs. 90 (Specimen No. 128).

587. (xi) Pôt, fabric of coarse chinia silk; dull orange; ashrafi (round *búṭis;* 4 yards × 30 inches; Rs. 100 (Specimen No. 129).

588. (xii) Pôt, ṭukra (*i.e.* woven in a small piece, not an entire thán) for ladies' trimmings and *chiffons à l'Indienne*, also for handkerchiefs; bright pink, with tárá (star) búṭi (small), and satpankhá búṭi (large), in gold thread; 1 yard × 23 inches (Specimen No. 130).

589. Akin to the pôt tháns is a fabric known as *báfta* (literally woven), produced in Benares; body pure silk, with *búṭis* in kalábatún or cloth; 4½ yards ×25 inches; Rs. 12 (when kalábatún); used for angarkhás, kôts, and women's paijámas (Musalmáns).

XVII.—Cheoli and Dhúp-chhaon.

590. Cheoli is an old silk fabric with a bright satin sheen in the best specimens, also a certain amount of watery effect; produced in Benares; resembles satin.

XVII.—Cheoli.

591. (i) Kamḳhwáb cheolis; dark blue; woven like kamḳhwáb with three layers of warp; used for hems and borders of kamḳhwáb clothes; width 27 inches; length various; 1½ tola per rupee (Specimen No. 131).

592. (ii) Cheoli; deep red, with satin sheen; close texture; used for hems and borders of garments; 4 yards × 35 inches; price 1½ tola per rupee (Specimen No. 132).

593. Dhúp-chhaon (shot silk) is also manufactured in Benares, but I have not yet obtained a specimen. The principle in weaving is to have a warp of one colour and weft of another colour, so that with each change of light a different colour will be seen, with just a suggestion of the other colour. *Dhúp-chhaon* literally means "sunshine and

Dhúp-chhaon (shot silk).

shade"; there is generally a brilliant light colour and a dark colour; green and red are the favourite colours. In the specimen before me it is blue and orange; this specimen was obtained locally in Karwi, but is imported probably from Bombay. Benares thâns vary in dimensions and are used for all kinds of garments; sold by the tola in the large kârkhânas, elsewhere by the yard; specimen No. 133.

XVIII.—Miscellaneous Fabrics.

XVIII.—Miscellaneous fabrics.

594. Hitherto we have considered important fabrics in detail and attempted to group together fabrics having similar characteristics. Now we shall take the remaining fabrics which are of minor importance all one after another in alphabetical order.

Ára.

595. Árá; a cheap, coarse flimsy fabric, generally silk with cotton, worn in lhengas by Hindu women; 10 yards × 21 to 40 inches wide; Rs. 2-8-0 to Rs. 5; specimen No. 135; District Sháhjahánpur.

Banúsa.

596. Banúsa; a coarse fabric made in Azamgarh; sombre colours; generally stripes; warp pure silk; weft cotton and tasar; used for lhengas; 4½ yards × 33 inches; Rs. 1-8-0 (Specimen No. 136).

Bhágalpuri.

597. Bhágalpuri; a fabric reported from several districts; a *tasar* fabric; probably in most cases imported from Bengal. I have, however, heard drapers call any coarse silk or mixed silk fabrics Bhágalpuri or Kosa or Kúsa, and that use of the word would include Kosi or Cossi silk recently manufactured and offered for sale in Benares.

598. (i) Meerut Nauchandi Fair, 1899. Bhágalpuri for coats and men's clothing; plain; 9 yards × 30 inches; tasar mixture; Rs. 9.

599. (ii) District Aligarh. Bhágalpuri; coarse; gray and cream-coloured; silk and tasar; used for angarkhás, achkans, coats, and sadris; 7 to 10 yards × 1 yard; Rs. 4 to Rs. 10 and Rs. 10 to Rs. 25.

600. (iii) District Sháhjahánpur. Bhágalpuri; line and check patterns; used for men's coats; 10 yards × 3½ feet; Rs. 3 to Rs. 10.

601. (iv) District Jálaun. Bhágalpuri; mixed silk and cotton; used for men's angarkhás and turbans; 8 yards × ¾ yard to 1 yard; Rs. 3.

602. (v) Benares. Cossi silk sold by Messrs. Stephen Doss & Co. and Kálidas Mitra; worn by Europeans in the hot weather; introduced from Bengal; a coarse fabric said to improve in texture and softness by washing; 7 yards × 54 inches; Rs. 16 (Specimen No. 137).

Chúriya.

603. Chúriya; produced in Farukhabad and Agra; bright plain colours, usually yellow, green, or pink, with lines of another colour; used for lhengas, paijámás and borders of garments; 22 yards × 18 inches; superior quality soft and thick, Rs. 13-12-0; second quality, thinner and rougher, Rs. 11 per thán (Specimen No. 138).

Ghâma.

604. Ghâma; a tasar and silk fabric reported from Aligarh and Sháhjahánpur; used for lhengas and dupaṭṭás by women, and for achkans and turbans by men.

605. (i) District Aligarh. Plain, warp of tasar, weft of silk; 10 yards × 1 yard; Rs. 3 to Rs. 6.

606. (ii) District Sháhjahánpur. Plain in green, purple, and red; 10 yards × 2½ or 3 feet; Rs. 3-7-0; mixed with a little cotton.

Kasab.

607. Kasab; a pure silk fabric made in Agra and Farukhabad; used for lhengas by Hindu women; in Farukhabad its use is confined to Káyasth brides at their nuptials; generally of a red colour. The well-known lexicons *Ghayás* and *Khyában* describe it as having been originally made from silk or linseed bark, the form قصب having been Arabicised from Hindi Kasab. कसब॰

SPEC. NO. 3
SEC. 289

SPEC. NO. 35
SEC. 412

SPEC. NO. 48
SEC. 461

SPEC. NO. 58
SEC. 474

SPEC. NO. 56
SEC. 469

SPEC. NO. 60
SEC 476

608. (*i.*) District Farukhabad. Dull pinkish red; stripes; 22 yards × 27 inches; warp of twisted thread; weft untwisted; Rs. 11 (Specimen No 139).

609. (*ii.*) District Agra; red; plain; 1 yard wide, Rs. 2 per yard; 27 inches wide, Re 1-8-0 per yard; inferior quality 27 inches wide, Re. 1-4-0 per yard (Specimen No. 140).

Manáphal or Pináphal.

610. Pináphal or manáphal (corrupted from *pineapple*) so called because of the pineapple pattern on it; used by men for kurtas and sadris, and by women for kurtas and covering sheets; 60 yards × 1¼ to 1½ yard; Rs. 52-8-0 to Rs. 67-8-0.

Sásanlet.

611. Sásanlet (corrupted from *sarcenet*); reported only from Budaun, but widely used in all districts for hems, borders, and quilt covers; plain, 50 yards × 17 inches, Rs. 20; mixed with tasar; probably imported (from Europe).

Sinkia.

612. Sinkia; a soft striped fabric in red, dark red and green, made in Farukhabad; sometimes check-pattern; the term is derived from *sink*, broom* *(cytisus scoparius)*, hence any stick or stripe; used for lhengas and paijámás by Hindu and Musalman women respectively; warp, twisted silk; weft, untwisted; 22 yards × 18 inches, Rs. 11 (Specimen No. 141).

Tápti.

613. Tápti (Persian *táftan*, to weave or twist); a showy fabric in bright fancy checks; pure silk or mixed with cotton; manufactured in Farukhabad generally with pure silk; used by Hindu and Musalmán women for lhengas and paijámás respectively; 22 yards × 27 inches, Rs. 13-12-0 (Specimen No. 142).

Velvet not woven.

614. Besides the above, a great number of fabrics imported from outside the Provinces are found in common use, for example from outside India, or from Bombay, Bengal, Mysore, &c. The only important silk fabric not at all woven in the Provinces is velvet.

* *Cf. sink topi* = straw hat.

CHAPTER IX.

Silk Trade and Industry; its present condition and its prospects.

Mulberry silk produced in two places.

615. As we have seen, the production of raw mulberry silk in these Provinces is confined to the Lister estate in Dehra Dún and the estate of the Honourable Rája Rámpál Singh in the Partábgarh district, while tasar is collected in the Mirzapur district. The forest experiment with the Chinese tasar worm in Chakráta, however successful it may be as a scientific experiment, is not likely to develope an industry in these Provinces, considering the high altitude at which alone the food of the worm is found.

(i) Lister estate: prospects.

616. The Lister estate may possibly develope a flourishing industry, but its fortunes as regards the silk industry have varied so much in the past that it is difficult to form a forecast for the future with any confidence. This, however, is certain, that the silkworm can be reared in the Dún, and with proper precautions for the supply of healthy seed and a due regard to the principles and methods of cottage cultivation sericulture can be made a paying concern.

(ii) Partábgarh estate: expert opinion.

617. About the prospects of the Partábgarh venture a very hopeful opinion was expressed by Professor Mukerji, of the Sibpur Civil Engineering College. I will content myself with an extract from the *Pioneer* of November 9th, 1898, in which this expert opinion is quoted :—

"I am surprised to see the progress that has been made in sericultural work at the Dharupur centre. Twenty-one pieces of *eri* cloth have been woven besides two pieces of cloth out of mulberry silk. The spinning of *eri* thread is being done by four women and one man, and there are about three seers of the thread ready for weaving. Nearly a maund of *eri* pierced cocoons is also in stock, which will make another 20 or 25 pieces of cloth. If these can be sold at Rs. 15 per piece Rs. 600 will be realized, which will more than repay the cost incurred in these operations This economical way of initiating an altogether new industry in all its branches is very creditable to Pandit Darshan Lál. The eri silk rearing industry is now beyond the experimental stage, and attempts should now be made, through *zillidárs*, to get tenants to do the rearing of worms and spinning of eri silk. The mulberry silk rearing experiment has not been altogether a success, but I attribute this ill-success entirely to the mulberry, which is not of the kind suitable for rearing Bengal silkworms of the proper kind. A step in advance, heralded by the planting of *Morus Indica*, *Morus Alba*, and *Morus Sinensis*, should now be taken with regard to mulberry silk-rearing, which is the more difficult, but is the more profitable, and therefore worth while introducing."

618. I believe it is the Rája's intention to plant several hundred acres of mulberry and castor oil plants and develope both the branches of the industry referred to above.

Tasar industry of Mirzapur; prospects of extension.

619. As regards the tasar industry of Mirzápur, the late famine has very much decreased the output. Supposing, however, that it regains its former volume, as is more than probable, the question arises: "Is it capable of extension?" The question has been officially considered before, and a *résumé* of the salient points brought out by the Government inquiry would be desirable.

620. Tasar silk was brought greatly into prominence after the outbreak of the disease which played such havoc amongst the mulberry worms in Europe in the Sixties, which turned people's attention to new sources of supply of silk. The proceedings of the Revenue and Agriculture Department of the Government of India

for 1879 contain a large amount of information on this subject. Government attention was then directed to obtaining all the information possible about the tasar of India. In their Resolution of 1875 the Government reviewed the information then available, and pointed out two obstacles in the way of the more extensive use of the silk, namely, first, defective reeling and, secondly, difficulties in dyeing. As to the difficulties of dyeing Mr. Wardle claims to have since discovered a new method of dyeing this silk and giving it the lustre of China silk, and practical technologists in France and Italy are said also to have devised new dyes which tasar will take. As to the difficulties in reeling they arose from two causes, *viz.* (1) that the natural brownish yellow gum exuded by the worm in spinning its filament is not easy of dissolution and (2) there is an inherent defect in the filaments themselves which prevents their yielding a smooth and continuous thread. As far as a solvent to the gum is concerned, again, it was a mere matter of practical chemistry and had already been solved by means of a simple alkaline solvent mentioned in the Resolution itself.

Government of India Resolution of 1875. Points out two obstacles.

621. The difficulty about the inherent defects in the fibre is thus described in the Resolution:—"It must be remembered that the thread of the tasar silkworm is spun from a double spinnaret, and that these filaments are not parallel, lying close side by side, but are spirals touching each other only at the exterior points of their curves but united by the natural gum in and with which they are exuded, and it is not on this spirality that the elasticity of the silk depends. Now, in reeling the silk, it is necessary that the spirals should be ground well into each other so as to form an even round thread, but it is doubtful whether the filaments can be brought to bear the amount of croissure necessary to produce the round thread, and without this it will be impossible to provide an article of export which will be acceptable in the European market."

An inherent defect in fibre.

622. Mr. Wardle in his hand-book published in 1881 makes light of this difficulty, and has several times exhibited specimens of woven tasar silk in different exhibitions. He considers it eminently suitable for rugs, carpets, upholstery and an imitation sealskin. A cheap method of spinning tasar and waste silk now practised in English silk mills has also very much altered the situation in favour of these wild silks. The main question now is whether the cost of collecting the silk in its wild state, of erecting the extensive filatures in which alone the reeling could be done on a thoroughly satisfactory basis, and of overcoming the resistance which its fibre opposes to ordinary tinctorial matter, would not in the end be greater than in the case of the mulberry silk, of which the silkworm is so prolific and is so much more easy of domestication.

Overcome by spinning tasar.

Question of cost.

623. The average quantity of *tasar* cocoons annually collected in Mirzapur for normal years was four to five millions; it was about two millions last year. It is not probable that the wild kuswári insect in other districts will yield a fibre which will be profitable to work economically, but the conditions of the southern portion of the Karwi Sub-Division are so similar to the tract of the Mirzapur district where tasar cocoons are collected, that a development of the tasar trade in this direction would be possible. Both these tracts are covered with hilly forests; in both cases it is the spurs of the Vindhya mountains coming from Central India, which form the main features of the country. Both are inhabited by Kol aboriginal tribes. It must be due to a mere accident that tasar cocoons are collected in Mirzapur, while they are not collected in Karwi. I believe that on the Karwi plateau, just beyond the borders of British territory, a certain amount of local trade is done in wild cocoons, and fabrics are said to be manufactured in Rewah territory.

Karwi and Mirzapur hill tracts similar, but no tasar collected in Karwi.

624. Now we come to the centres of silk manufacture; these are Benares, Agra, Azamgarh, Farukhabad, and Jhánsi, though the manufacturing industry in Jhánsi is moribund. There is no *rapport* in these provinces between the silk-producing and the manufacturing centres. What little raw silk is produced is mostly exported, while the much larger quantities in demand for the manufactures is mostly imported.

Centres of silk manufacture.

625. The origin of the kamḳhwáb industry in Benares has not been traced. The city has been from very ancient times an important religious centre of the Hindus. Already in the time of the Chinese pilgrim Hwen-Thsang it was the centre of a kingdom (Vara-Nasi) devoted to the worship of Shiva with 100 temples giving accommodation to 10,000 resident devotees. Pilgrims must have flocked thither from all parts of India during the centuries that preceded and followed, although probably the modern importance of Benares is due to the resuscitation of the national form of Hinduism in Northern India after a brief interruption during the mediæval age owing to political causes. The resort of so many pilgrims, some of them princes and wealthy noblemen from all parts of India, could not fail to stimulate commercial activity; and silk being considered pure by the Hindus for ceremonial purposes the manufacture of silk cloth would naturally find a convenient centre there. The climate being unsuited to sericulture, it would not pay to manufacture ordinary silk cloth to any great extent, but costly stuffs like kamḳhwábs and Banárasi dupaṭṭas which would specially commend themselves to wealthy pilgrims and in the price of which workmanship was a large factor, could be manufactured and sold at a profit, especially considering that they would derive a reflected sanctity from their connection with so holy a place.

(i)—Benares.

626. The Benares silk weavers are principally Muhammadans, but Kunbis, Ahírs, Koris, Bráhmans, Rájputs, and others who have learnt the work are also employed. The lower castes of Hindus are generally excluded. The wire workers are with a few exceptions drawn from the Hindu castes above-mentioned. Though organized guilds with definite bye-laws are unknown, the *birádari* exercises a certain amount of trade discipline, and the customary understandings on which the artisans work seem to be recognised as having a binding force among themselves.

627. Agra was a royal city in Mughal times, and the traditions of the silk trade there all look back to Turkish and Persian influences. A mulberry plantation was said to have been made in Jamna Bágh by a Mughal Emperor much as James I made his mulberry plantations in St. James's Park. The Iláyecha and Daryái still manufactured claim to be revivals of the Alcha and Dárái mentioned in the *Áin-i-Akbari*, and both these fabrics are probably of foreign origin. Agra silk fabrics seem to have had some reputation in Europe a hundred years ago, for we find in Sir Walter Scott:—

(ii)—Agra.

> " A lordly and a lofty room,
> Part lighted by a lamp with silver beam,
> Placed by a couch of Agrá's silken loom
> And part by moonshine pale, and part was hid in gloom."
> —*Lay of the Last Minstrel, Canto VI.*

628. At present, however, the Agra manufactures are in a languishing condition. There are a few weavers in Nái-ki-mandi, Lohár-ki-mandi, and Sháhganj, and there is the manufacturing firm of Messrs. Mujtabá & Co., whose aim is to revive the old industry; and let us wish them all success.

629. The Azamgarh silk industry was, like the Agra industry, probably brought in by foreign Musalmáns, and not without the shadow of royal patronage, for the pargana of which Mau Azamgarh was the capital was the special jágír of a royal Princess, Jahánára Begam,

(iii)—Azamgarh.

(daughter of Sháhjahán), who built a *katra* or market place in the town. The fabrics of Azamgarh district are mixed fabrics, silk or tasar with cotton, in deference to the prohibition of pure silk fabrics for men by the law of Islám.

630. The weaving industry of Azamgarh district seems at one time to have been exceedingly flourishing. There are towns and villages in which the majority of the population are of the weaver caste or connected with weaving. Mr. Geoghegan in his "Silk in India" (1880) quotes figures from Mr. Montgomery's Settlement report of 1837 for Azamgarh district. It would appear that there were then manufactured in Azamgarh district 318,722 pieces of tasar. The term tasar is locally applied to mixed fabrics. In the latest Settlement Report of 1879 (Mr. Reid's) the total number of looms for the district was estimated at 13,058 and divided among a number of villages. A great proportion of the product of these looms was no doubt cotton fabrics, but the mixture of silk and cotton or tasar and cotton is so common in the district that it is difficult if not impossible to exhibit the result for silk or tasar separately. Mau, Kopa, and Mubárakpur are the towns in which the weaving industry predominates.

631. The Azamgarh industry has still considerable vitality. Cotton weaving has no doubt suffered in the race with cheap Manchester fabrics, but in silk fabrics, especially of the mixed kind manufactured in this district, there is a peculiar adaptation to local conditions and prejudices, which enables the industry to hold its own, or at least to decline less slowly than it would otherwise have done. A good trade is carried on with the neighbouring districts; Azamgarh fabrics are known in every market in these provinces; and there is a certain amount of trade with Nepál. In Mr. Reid's time there was an agency at Amráoti and there must be similar agencies now.

632. Azamgarh satinette was one of the provincial art manufactures exhibited for sale under the auspices of the Department of Agriculture and Commerce in Laurie's Great Northern Hotel, Allahabad, during the year 1883-84 and it appears to have been fairly popular with strangers visiting the province, judging from the figures for sale.

(iv)—Farukhabad.

633. The Farukhabad and Jhánsi manufactures may be dismissed in a few words. The former has three factories which turn out very coarse fabrics, chiefly lhengas and paijámas.

(v)—Jhánsi.

In Jhánsi there are about 200 families of Kushtas, of whom only twenty work in silk. They turn out rumáls, borders, and ends of sáfás, sáris, lhengas, &c.; but their designs, old as they are, are worked with exceptional purity and good taste.

Capital in provincial industry:

(i) Manufacturing.

634. The total capital employed in the industry in these Provinces cannot be estimated. The district reports are generally silent on the point, but the Benares report estimates about 30 lakhs for that district; the Azamgarh report estimates about 1 lakh for Azamgarh district, and the Mirzapur report about Rs. 8,000 for the tasar-collecting industry in Mirzapur.

(ii) Trade.

635. Nor are there any materials for estimating the trade (as opposed to manufacturing) capital. Most *bazzázes* (drapers) in every town, large or small, have silk fabrics in stock during the Hindu marriage season (Sahálag) in spring; most of these are cheap imported fabrics; when rains come with the Sáwan festivals, there is again a demand in such districts as Muttra, where these festivals are celebrated with much splendour, but during the rest of the year the trade in silk is "dull," and the capital is turned over to more lucrative uses.

Statistics of trade.

636. The figures for the provincial traffic, however, are available, and will be found in Statements I to V. It should be explained that the registration of traffic is carried out under the supervision of the Director of Land Records and Agriculture in territorial

blocks. These blocks correspond in most cases to the administrative Revenue Divisions or Commissionerships of these Provinces, with the exception that the Oudh block includes the two Commissionerships of Lucknow and Fyzabad, and the Gorakhpur Commissionership is included in the Benares block, while Kumáun is included in the Rohilkhand block. The figures do not include waterborne traffic as this has begun to be registered only this year. Having no seaport, the United Provinces do no direct foreign as opposed to Indian trade, the silk trade by land with Nepál and beyond being inconsiderable.

637. It will be seen that we imported on an average of five years ending in 1897-98 (financial year) 1,919 maunds of silk, raw and manufactured, valued at Rs. 13,34,563 while we exported 547 maunds valued at Rs. 2,62,035. The fabrics (piece-goods) imported were 1,079 maunds valued at Rs. 9,50,625; and those exported were 166 maunds valued at Rs. 1,12,397; so that the imported maund was on the average valued at Rs. 881, while the exported maund at only Rs. 677. This shows that after all the costly gold kamkhwábs of Benares do not play a preponderating part in the exports from these Provinces.

Effects of famine.

638. When we examine the export and import figures by years in detail (Statements III and IV), we see a sudden drop beginning from 1895-96. That can be easily explained by the fact of the famine which began in that year and lasted during the year 1896-97. The imports after the famine have shown a tendency to recover; but the exports have not yet shown that tendency. The manufacturing classes appear to have suffered more during the famine than the agricultural classes, or perhaps it would be more correct to say that the famine dislocated the artisan and manufacturing occupations more than the agricultural. One or two good seasons bring back the Indian agriculturist to his former position; but when an organized industry is dislocated, it is not so easy to set the wheels going again for some time.

Provincial silk traffic compared with that for India.

639. By the courtesy of the Statistical Bureau of the Government of India I have been able to obtain Tables VI, VII, and VIII, which will show the part taken by the North-Western Provinces and Oudh in the whole internal trade (rail-borne) of India, from the point of view of imports and exports; and also the land frontier export trade of these Provinces compared with that of the whole of India. This last of course in the case of these Provinces refers to Nepál and Thibet. The imports from this direction are practically *nil*, and the table relating to them has therefore not been reproduced.

Census statistics.

640. Statements IX and X will show the census statistics regarding the silk industry. In the census of 1881, 3,736 persons, male and female, were returned under the silk occupations; distinct figures are given by districts for the males; but the females are grouped together in the provincial total. In 1891 the number was 14,936, an apparent increase of 11,200. But this is due to different principles having been followed in the enumeration at the two censuses, and any comparison would be fallacious. In Azamgarh district no one was returned as following an occupation connected with silk in 1881, while in 1891 the number was 904. Probably the weavers of Azamgarh went under the heading "cotton weavers" or some other heading on account of the mixed fabrics they manufacture. The figures for Mirzapur, again, 4 and 35 respectively, seem to include a portion only of the Koa-collecting population; a large number of them follow other occupations when the tasar season is off, and would probably return themselves under other heads. The total number of those combining agriculture with silk occupations (not shown in our tables) is 16, *viz.* 1 male and 15 females; it is not agriculture that is combined with the silk industries, but cotton or other kinds of weaving. The noticeable points in the figures of 1891 are that Benares returns 12,871 persons out of the provincial total of 14,936, and next to it *longo intervallo* come

Azamgarh and Agra with 904 and 546, respectively. The only other district returning a number higher than 100 is Lucknow with 215; but the majority of these must be "braid and ribbon makers and sellers;" in other words iláqe-bands and patwas.

641. The silk industry is almost purely an urban industry; out of a total of 14,936, the urban population connected with silk was 14,712. It will also be seen that out of the total number of persons engaged in the different branches of the silk industry, *viz.* 14,936, the number engaged as weavers and traders amounts to 12,949. Thus there is very little sericulture in the Provinces, though there is a fair amount of silk trade and industry.

Silk industry purely urban

STATEMENT I.—*Showing the average annual import and export trade in silk of the several blocks of North-Western Provinces and Oudh with other parts of India during the five years* 1893-94 *to* 1897-98.

Articles and whence imported or to where exported.	Imports into the North-Western Provinces and Oudh.								Exports from the North-Western Provinces and Oudh.							
	To Meerut block.	To Agra block.	To Allahabad block.	To Benares block.	To Rohilkhand block.	To Oudh block.	Total. Weight.	Total. Value.	From Meerut block.	From Agra block.	From Allahabad block.	From Benares block.	From Rohilkhand block.	From Oudh block.	Total. Weight.	Total. Value.
SILK, RAW.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Rs.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Rs.
(1) *Foreign.*																
Bengal excluding Calcutta.	...	...	...	...	1	...	1	351	...	...	...	...	...	...	...	...
Panjáb ...	...	...	1	...	...	...	1	357	...	..	...	3	...	...	3	1,368
Bombay Port ...	...	3	7	...	...	...	10	3,277	...	...	...	...	...	...	...	...
Calcutta ...	...	...	4	...	...	...	4	1,580	...	..	...	...	...	...	...	...
Other provinces ...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	104
Total ...	...	3	12	...	1	...	16	5,565	...	...	...	3	...	...	3	1,472
(2) *Indian.*																
Bengal excluding Calcutta.	1	4	74	225	1	18	323	1,56,196	...	1	11	38	...	...	50	19,817
Panjáb ...	8	...	1	2	2	1	14	3,251	2	...	1	2	1	...	6	2,260
Central Provinces ...	...	...	...	1	...	...	1	420	8	...	1	285	...	...	294	1,14,754
Rájputána and Central India.	36	...	4	61	...	...	101	40,105	...	3	4	3	...	...	10	4,192
Bombay Port ...	40	3	2	2	...	...	47	17,499	...	...	...	6	...	...	6	2,460
Calcutta ..	9	6	286	35	1	1	338	1,60,902	1	...	4	5	1	...	11	4,255
Other provinces ...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	468
Total ...	94	13	367	326	4	20	824	3,78,373	11	4	21	340	2	...	378	1,48,166
SILK PIECE GOODS.																
(3) *Foreign.*																
Bombay Port ...	...	1	90	...	1	...	92	34,299	...	...	...	...	...	...	...	...
Calcutta ...	...	...	34	...	...	...	34	30,484	...	...	...	...	...	...	...	...
Other provinces ...	1	1	...	..	...	...	2	3,331	...	...	1		...	...	1	728
Total ...	1	2	124	...	1	...	128	68,114	...	...	1	...	...	...	1	728
(4) *Indian.*																
Bombay Presidency excluding Bombay Port.	...	...	...	...	...	...	...	...	...	...	...	58	...	...	58	38,621
Bengal excluding Calcutta.	1	4	503	32	2	4	546	5,20,785	...	...	5	1	...	10	16	10,455
Panjáb ...	1	2	7	1	9	2	22	12,418	2	1	7	5	6	2	23	15,579
Berar ...	...	...	...	...	...	...	...	...	...	...	...	21	...	...	21	14,073
Bombay Port ...	1	2	47	1	...	1	52	31,638	...	...	...	4	...	...	4	2,547
Calcutta ...	2	7	304	3	15	...	331	3,17,536	8	...	25	1	...	...	34	22,886
Other provinces ...	...	...	...	...	...	...	...	134	...	...	3	6	...	...	9	7,508
Total ...	5	15	861	37	26	7	951	8,82,511	10	1	40	96	6	12	165	1,11,669
Total, Silk ...	100	33	1,364	363	32	27	1,919	13,34,563	21	5	62	439	8	12	547	2,62,035

STATEMENT II.—*Showing the average annual trade in silk between the several blocks of the North-Western Provinces and Oudh, during the five years from* 1893-94 *to* 1897-98.

Articles and whence exported.	To Meerut block.	To Agra block.	To Allahabad block.	To Benares block.	To Rohilkhand block.	To Oudh block.	Total.
	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.	Mds.
SILK, RAW.							
(1) *Foreign.*							
Meerut block	...	...	...	..	..	...	...
Agra do.	...	...	...	...		...	...
Allahabad do.	...	...	..	...	...	...	...
Benares do.	...	...	...	...	...	1	1
Rohilkhand do.	...	...	...	..	...	1	1
Oudh do.	...	...	...	...	1	...	1
Total ...	...	...	...	...	1	2	3
(2) *Indian.*							
Meerut block	...	1	1	...	...	...	2
Agra do.	...	...	1	...	...	...	1
Allahabad do.	...	4	...	10	...	1	15
Benares do.	...	...	12	...	...	3	15
Rohilkhand do.	...	7	...	...	...	...	7
Oudh do.	...	5	...	1	...	...	6
Total ...	...	17	14	11	...	4	46
SILK PIECE-GOODS—							
(3) *Foreign.*							
Meerut block	...	...	...	...	...	...	...
Agra do.	...	...	...	...	...	...	...
Allahabad do.	...	...	...	...	...	...	...
Benares do.	...	...	...	...	...	...	...
Rohilkhand do.	...	...	...	...	...	...	...
Oudh do.	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...
(4) *Indian.*							
Meerut block	...	45	...	...	...	..	45
Agra do.	...	...	...	...	...	...	...
Allahabad do.	...	3	...	2	40	2	47
Benares do.	...	...	2	...	...	1	3
Rohilkhand do.	1	2	...	...	...	...	3
Oudh do.	...	...	...	1	..	...	1
Total ...	1	50	2	3	40	3	99
Total, Silk ...	1	67	16	14	41	9	148

NOTE.—Figures of value are not available for internal traffic.

STATEMENT VI.

Internal Trade in Silk, raw and manufactured, of India, compared with the portion taken by these Provinces.

Rail-borne—No. 1, Imports.

Raw Silk.

	India generally.					
	Foreign.		Indian.		Total.	
	Quantity, maunds.	Value, rupees.	Quantity, maunds.	Value, rupees.	Quantity, maunds.	Value, rupees.
1893-94 ...	10,451	37,95,363	38,654	1,51,78,978	49,105	1,89,74,341
1894-95 ...	12,148	43,79,440	29,086	1,60,74,258	41,234	2,04,53,698
1895-96 ...	16,104	54,76,297	35,304	1,81,61,220	51,408	2,36,37,517
1896-97 ...	14,737	46,86,520	29,092	1,50,97,458	43,829	1,97,83,978
1897-98 ...	16,657	45,84,682	32,125	1,66,05,172	48,782	2,11,89,854
	Into North-Western Provinces and Oudh.					
1893-94 ...	...	...	1,028	3,68,895	1,028	3,68,895
1894-95 ...	29	10,669	690	3,76,065	719	3,86,734
1895-96 ...	10	3,347	689	3,28,367	699	3,31,714
1896-97 ...	10	3,086	855	3,94,951	865	3,98,037
1897-98 ...	26	10,726	862	4,23,589	888	4,34,315

Silk Piece-goods.

	India generally.					
1893-94 ...	7,838	33,28,451	7,532	62,36,575	15,370	95,65,026
1894-95 ...	7,680	30,93,439	6,031	53,44,875	13,711	84,38,314
1895-96 ...	6,788	26,95,114	4,216	34,65,192	11,004	61,60,306
1896-97 ...	6,398	24,73,677	6,449	52,51,239	12,847	77,24,916
1897-98 ...	3,448	17,72,323	7,512	64,90,236	10,960	82,62,559
	Into North-Western Provinces and Oudh.					
1893-94 ...	140	63,429	1,578	13,89,464	1,718	14,52,893
1894-95 ...	196	74,086	1,205	11,53,807	1,401	12,27,893
1895-96 ...	123	51,965	478	4,37,724	601	4,89,689
1896-97 ...	175	1,46,267	468	4,44,462	643	5,90,729
1897-98 ...	10	4,823	1,026	9,87,096	1,036	9,91,919

STATEMENT VII.

Internal Trade in Silk, raw and manufactured, of India, compared with the portion contributed by these Provinces.

Rail-borne—No. 2, Exports.

Raw Silk.

	India generally.					
	Foreign.		Indian.		Total.	
	Quantity, maunds.	Value, rupees.	Quantity, maunds.	Value, rupees.	Quantity, maunds.	Value, rupees.
1893-94 ...	10,451	37,95,363	38,654	1,51,78,978	49,105	1,89,74,341
1894-95 ...	12,148	43,79,440	29,086	1,60,74,258	41,234	2,04,53,698
1895-96 ...	16,104	54,76,297	35,304	1,81,61,220	51,408	2,36,37,517
1896-97 ...	14,737	46,86,520	29,092	1,50,97,458	43,829	1,97,83,978
1897-98 ...	16,657	45,84,682	32,125	1,66,05,172	48,782	2,11,89,854
	From North-Western Provinces and Oudh.					
1893-94 ...	...	...	1,163	4,51,607	1,163	4,51,607
1894-95 ...	1	520	433	1,68,870	434	1,69,390
1895-96 ...	13	6,838	238	95,200	251	1,02,038
1896-97 ...	...	...	139	55,600	139	55,600
1897-98 ...	...	....	53	21,200	53	21,200

Silk Piece-goods.

	India generally.					
1893-94 ...	7,838	33,28,451	7,532	62,36,575	15,370	95,65,026
1894-95 ..	7,680	30,93,439	6,031	53,44,875	13,711	84,38,314
1895-96	6,788	26,95,114	4,216	34,65,192	11,004	61,60,306
1896-97 ...	6,398	24,73,677	6,449	52,51,239	12,847	77,24,916
1897-98 ...	3,448	17,72,323	7,512	64,90,236	10,960	82,62,559
	From North-Western Provinces and Oudh.					
1893-94 ...	...	...	244	1,63,144	244	1,63,144
1894-95 ...	...	...	143	96,382	143	96,382
1895-96 ...	2	1,820	309	2,07,030	311	2,08,850
1896-97 ...	1	910	82	54,940	83	55,850
1897-98 ...	1	910	55	36,850	56	37,760

STATEMENT VIII.

FOREIGN (FRONTIER) TRADE IN SILK, RAW AND MANUFACTURED, OF INDIA, COMPARED WITH THE PORTION CONTRIBUTED BY THESE PROVINCES.

Exports.

Raw Silk.

	From India generally.		From North-Western Provinces and Oudh.	
	Quantity, cwt.	Value, Rs.	Quantity, cwt.	Value, Rs.
1893-94	85	23,798	1	500
1894-95	147	59,407	1	250
1895-96	575	2,59,385	...	...
1896-97	236	1,36,775	2	750
1897-98	116	62,814	1	500
1898-99	112	53,638	1	300

Manufactured.

	From India generally.		From North-Western Provinces and Oudh.	
	Quantity, cwt.	Value, Rs.	Quantity, cwt.	Value, Rs.
1893-94	314*	6,37,083	1	500
1894-95	471*	8,36,799	115	78,600
1895-96	481*	8,36,984	...	...
1896-97	624*	12,01,284	2	1,500
1897-98	644	12,15,908	...	...
1898-99	1,111*	13,68,391	...	...

* Incomplete.

STATEMENT IX.

Showing the distribution of the Silk industry throughout the provinces as compiled from the census returns of 1881 *and* 1891.

[The districts whose figures are blank for both censuses are omitted.]

District.	Number of persons engaged in the silk industry in the North-Western Provinces and Oudh.		District.	Number of persons engaged in the silk industry in the North-Western Provinces and Oudh.	
	1881. Males only.	1891. Males and females.		1881. Males only.	1891. Males and females.
Dehra Dún ...	5	...	Gházipur ...	1	6
Saháranpur ...	...	4	Azamgarh ...	...	904
Muzaffarnagar ...	...	6	Kumaun ...	..	34
Meerut ...	1	24	Tarái ...	2	2
Muttra ...	14	77	Sítapur ...	2	...
Agra ...	304	546	Fyzabad ...	2	...
Farukhabad ...	76	42	Lucknow ...	105	215
Mainpuri ...	16	...	Rae Bareli ...	...	2
Moradabad ...	...	14	Hardoi ...	...	9
Bareilly ...	46	...	Gonda ...	...	6
Sháhjahánpur ...	1	..	Bahraich ...	2	24
Cawnpore ...	6	51			
Hamírpur ...	...	2			
Bánda ...	1	...	Total Females for 1881.	911*	...
Allahabad ...	1	20			
Ballia ...	3	...			
Jhánsi ...	...	15	GRAND TOTAL N.-W. P. AND OUDH.	3,736	14,936
Benares ...	2,232	12,871			
Mirzapur ...	4	35			
Jaunpur ...	1	27	Difference 11,200.		

* The figures for females are not available by districts in the Census returns of 1881.

STATEMENT X.

Showing the Silk population of the provinces distributed by occupation as compiled from the census returns of 1891.

Details.	1891.								
	Provincial			Town or urban.			Country or rural.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
(1) Silkworm rearers and cocoon gatherers.	22	11	33	20	9	29	2	2	4
(2) Silk carders and spinners	842	933	1,775	842	933	1.775	...	...	...
(3) Silk weavers and dealers,	7,149	5,800	12,949	7,072	5,658	12,730	77	142	219
(4) Braid and ribbon makers and sellers.*	70	109	179	69	109	178	1	...	1
Total ...	8,083	6,853	14,936	8,003	6,709	14,712	80	144	224

* See section 245, chapter VI.

CHAPTER X.

Silk in Folk-lore and Literature.

642. Some of the ideas current among the people about the nature of silk are peculiar. Even the writer of one of the district reports for this monograph classifies silk thus :—

Popular notion of silk.

"Only the following varieties of silk are known to the people in this district, (1) silk made by insects, and (2) silk prepared from *chhál* (bark of trees) and generally known as *tasar!*"

643 The fact that he is not referring to fabrics of true bark is proved by his mention of *tasar*, satins, and Bhágalpuris as instances of *chhál* silk.

644. Fabrics from the barks of trees are possibly made; the *alsi* plant (linseed) also can yield a fibre capable of being utilized for fabrics; but bark is not fibre, neither is a vegetable fibre silk; and yet the confusion of these three articles is one of the most persistent "idols of the market-place" (as Bacon would call them) which one meets with in ordinary Indian notions of sillk. Not content with this, decadent Urdu poets feign a fabric called *katán*, to which they ascribe such fineness that the rays of the moon are said to tear it in fragments as a blast of wind would tear up a gossamer web. This katán is supposed by the ignorant to be a silk fabric, and by the learned to be made from the bark of the *alsi* plant; as a matter of fact the katán is nothing more than linen, a fabric made from the fibres of flax. No doubt *alsi* is a species or variety of flax, but the flax which yields the fibre is not the dwarf plant specialised for oilseeds, which Indian *alsi* is, but a tall plant grown for its fibre alone.

645. Elsewhere (as in Assam) the rearing of the silkworm is surrounded with great mystery by those who know the art, and there is a prejudice against women having anything to do with sericulture. In these Provinces the prejudice against women's share in sericulture is not found; but the Kols who cultivate the wild tasar of Mirzapur do undoubtedly consider that the habits of the insect and its rearing are secrets known to themselves only, and given to them as a gift by the gods. They attach a certain amount of religious significance to the trade, and observe various ceremonial rites to the neglect of other occupations during the period of sericulture. The ásan tree, which forms the food of the worm, is with them an object of veneration.

Superstitions about silk.

646. Among the Hindus, too, silk is associated with ceremonial rites, and their religious works are full of references to it. Various words are used in classical and Puranic Sanskrit to denote silk, *e.g.* चीनांशुक (chináshuka, Chinese cloth) क्षौम (kshauma) दुकूला (dukúla) पट्टवस्त्र (paṭṭavastra) कौषेय or कौशेय or कौशिक (kausheya or kaushika). With regard to most of these it is difficult to say whether the cloth referred to was really silken or fine woollen cloth or even muslin. There can be no doubt, however, with regard to कौषेय or कौशिक. It is evidently derived from कोष which means the cocoon of a silkworm.

Silk in Sanskrit literature.

This derivation is given by the great grammarian Pánini (IV Adhyaya 3, 12): कोषात् ढञ्=एय=कौषेय "*kosha+dhang* (—*eya*)= kausheya."

Pánini.

Thus silken cloths must have been known in the time of Pánini whose probable date is about 400B.C. (see Encyclopædia Britannica, article *Sanskrit.*)

647. A reference to silk is also found in the *Satapatha Bráhmana* (a very well-known Bráhmana of the White Yajur-veda). कौश (kausha), an archaic form of *Kausheya* being used. The quotation is

Satapatha Bráhmana.

कौशं वासः परिधापयति (kausham vásas paridhá payati, "causes him to wear silken dress") Weber's edition, Berlin—p. 433. As regards the age of the *Satapatha* the probability is that the main body of the work is considerably older than Pánini and the most recent parts cannot be later than Pánini—(Encyclopædia Britannica).

648. We next come to the mention of कौशेय in the literature of later times. In *Manu* there are several references, of which two may be quoted—

Manu.

V. 120—

कौशेयाविकयोरूषैः कुतपानामरिष्टकैः ।
श्रीफलैरंशुपट्टानां चोमाणां गौर सर्षपैः ॥

i.e. silken cloth and cloth made of sheep wool (should be purified or washed) with *usha* ("saline earth;" every zamíndár, patwári, and revenue officer knows *úsar* land), Nepál blankets with the powder of the arista or aritha fruit, *patta* sáris* with *bel* fruit and *kshauma* (cloth made of a kind of fibre or bark, linen?) with white *sarson* (mustard).

Again Manu, XII, 64:—

कौशेयंतित्तिरिर्हृत्वा चोमंहृत्वातुदर्दुरः ।
कार्पासतान्तवंक्रौञ्चो गोधा गां वाग्गुदोगुडम् ॥

i.e. one stealing silken cloth becomes (in the next life) a partridge; stealing cloth made of fibre or bark, becomes a frog; stealing a cotton-fabric, becomes a curlew; stealing a cow, becomes an alligator; stealing treacle becomes a vulture.

The age of Manu (Mánava Dharma Shástra) or at any rate of the present redaction of the work cannot be very well fixed, but it cannot be much later than the 6th or 7th century, A.D. The earlier portions of the work belong to the pre-Christian era.

649. There is a reference to कोष in its sense of the cocoon of the silkworm, in the other great lawgiver Yájnavalkya, III. 147.

Yájnavalkya.

650. In the Mahábhárata silk is mentioned in more than one passage.

Mahábhárata.

651. It occurs in the Vana Parva where Draupadi remonstrates with Yudhishthira for his extreme patience and mercy, bordering on cowardice and pusillanimity. The passage runs thus:—

या त्वाहं कोषिकैर्वस्त्रैः शुभ्रैराच्छादितंपुरा ।
दृष्टवत्यस्मि राजेन्द्र सा त्वां पश्यामि चारिणम् ॥

"I, who have seen you, O Lord of Kings, formerly clad in white silk apparel, now see you in rags."

652. The age of any particular passage in the Mahábhárata cannot be definitely stated: the work is believed by scholars to be full of interpolations of different periods.

653. Another passage may be mentioned from the Mahábhárata. The Sabhá Parva describes how Yudhishthira subjugated different countries one after another

* The precise meaning of Patta and Kshauma is difficult to ascertain. Sir W. Jones translates "Patta" by "vests and long drawers"; Apte's Dictionary suggests the idea of thin, coloured silk fabrics. For Kshauma, Apte's Dictionary, quoting Sákuntala, 4, 4, gives the meaning "silken cloth, wove silk."

and made them pay tribute. The rulers of these tributary states were then invited by Yudhishthira to his Rájasuya sacrifice to celebrate his conquest of the world. They came, and in homage to their paramount sovereign brought the chief products of their countries as presents. A long list of Rájas and their presents is given; among the presents are silk and other fabrics, armour, horses, elephants, gold, gems, and riches innumerable

654. The passage relating to silk runs:—

प्रमाणरागस्पर्शाढ्य बाल्हीचीनसमुद्भवं ॥
और्णं चरांकवंचैव कोटजंपट्टजंतथा ॥
कुटीकृतंतथैवाच कमलाभं सहस्रशः ॥
श्लक्ष्णंवस्त्रमकार्पासमाविकंमृदुचाजिनं ॥

Mahábhárat, Bombay Ed., Volume I, page 55, Sabha Parva, sec. 51, v. 26 and 27.

Translation:—They presented numerous woollen blankets from China, skins of the Ránku deer, and stuffs made of linen and of the fibres of insects; thousands of tháns of crisp texture, others *of texture as soft as the lotus;* also cotton and woollen fabrics, smooth to the touch.

655. A little further on, among the presents from the banks of the Sailoda river, "shaded with bamboos whistling to the breath of the wind," are mentioned boxloads of ants' *(pipilika)* gold, which some Pandits understand to mean brocades, the "ants" being silkworms.

656. *Kausheya (cocoon)* is also described in the Amarkosh, a most authoritative Sanskrit vocabulary, as being round, and resembling in shape an unopened blossom.

Amarkosh.

657. In Valmiki's Rámáyan, Canto Ayodhya, we have—

उत्तरीयमिहासक्तं सुव्यक्तंसीतया तदा ।
तथाह्येते प्रकाशंते सक्ताःशैशेय तंतवः ।

Valmiki's Rámáyan.

—meaning: (Bharat) believed that Sita had lain down there with her silk mantle, as the straw (which formed the bed) still held the delicate fibres of her dress sticking to it. The legend is that Bharat on his return to Ayodhya from his maternal grandfather's house heard how Ráma had been sent into exile. He was deeply moved, and starting to seek out Rama in his wanderings and bring him back to Ayodhya was met by Gúh, the prince of sailors, and learnt from him the whereabouts of Ráma and Sita. Bharat was also shown the spot where they had passed the night on straw. The look of the delicate thread of Sita's silken robe sticking to the straw made him burst into tears of fraternal love, and thus a worldly luxury gave the clue whereby the steps of a demi-god and his consort were traced.

658. In the Bhágwat Purán (Book X, ch. 9, verse 3), Jasodha, mother of Krishna, is described as using the churn, clad in a vestment of silk क्षौमंवासः with a girdle round her waist.

Bhágwat Purán.

This may be compared to the allusion in the Mahábhárat where Rukmini, wife of Krishna, comes to the Rájasui sacrifice of Yudhishthira, clad in garments of white silk. Rukmini may be taken to be a Hindu goddess of beauty.

659. In the Hindu cosmogony itself one of the gifts presented to Lakshmi when she was born at the churning of the ocean was yellow silk—*(vide* 8th chapter, Askandh, of the Bhágwat).

660. There are numerous allusions to silk in the Sanskrit dramatists: reference has already been made to a passage in the Sákuntala of Kálidás in the note to section 648.

The Sanskrit dramatists.

661. Silk is considered particularly pure for ceremonial purposes by the Hindus. A cotton garment once worn would require to be washed before it can be worn again at meal time; but silk can be worn any number of times without washing; in fact washing is said to render it unclean for ceremonial purposes as long as the silk fabric remains wet.

Washing of silk in Hindu ceremonials.

662. It is laid down in the Mitákshara, chapter Achára Darsha, that silk, wool, and other substances are not liable to get unclean. In case they do get unclean, exposure to the sun or folding and beating with the palm of the hand, or a sprinkling of drops of water will purify them. In ordinary phraseology silk is said to be "washed by the air."

Mitákshara.

663. The use of Pitambar and other silk cloths, as also of Rákhis and Anantas in Hindu religious rites and festivals has already been mentioned in different places in the Monograph (*e.g.* see sections 242, 250).

Silk in Hindu festivals.

664. Pitambar, it may be noted, is one of the fabrics associated with Ráma, one of whose titles is "Pitambar-clad." Hence that beautiful invocation to Ráma in Tulsi Das's Rámáyan, commencement of the Áran Kánd ("The Forest"):—"O thou Pitambar-clad, of colours as various as a rain-charged cloud [at even]; With bow in thy beautiful hand, and thy comely quiver full of arrows; Lotus-eyed, with luxurious hair on the head tied up in *Jata* coils."

Pitambar.

665. Tulsi Dás died in Sambat 1680, equivalent to 1623 A.D. In his day sericulture must have been fairly common, for he says:—

The poet Tulsi.

"Pát kíṭ se hoë, tá te pitámbar ruchir
"Krami pálaye sab koi, param apáwan, prán sam"

"'Tis a worm that produces silk; from it are made beautiful silken fabrics; though quite unholy, this worm is reared by all (and held as dear) as life."
————————(Rámáyan of Tulsi Dás, Book VII, soratha 9).

666. Tulsi Dás's period of activity corresponded with the reign of the Mughal Emperor Jahángir (1605—1627). It was in this reign that Sir T. Roe came on his embassy to the "Grand Mughal," and we know from him that he was impressed with the splendours of the silken stuffs that he saw in this part of the country.

Silk in Muhammadan India.

667. In the *Ain-i-Akbari* will be found a detailed notice of the silk fabrics manufactured in Akbar's time. He sought to substitute Hindi (Sanskritic) names for various Persian and Arabic names of garments and fabrics previously in use.

"Ain-i-Akbari."

668. The earliest notice of silk, however, in connection with the Musalmán period is in the memoirs of a Damascus traveller, Shahábuddin Abul-Abbás-Ahmad, who came from Egypt to this country in the reign of Muhammad Tughlak (1325—1350 A.D.).

Abul Abbas Ahmad.

Of the Mughal Emperor he says:—*

"The Sultán has a manufactory, in which 400 silk weavers are employed, and where they make stuffs of all kinds for the dresses of persons attached to the Court, for robes of honour and presents, in addition to the staffs which are brought every year from China, Irák, and Alexandria. Every year the Sultán distributes 200,000 complete dresses, 100,000 in spring and 100,000 in autumn. The spring dresses consist principally of the goods manufactured at Alexandria. Those of the autumn are almost exclusively of silk manufactured at Delhi or imported from China and Irák. Dresses are also distributed to the monasteries and hermitages.

669. "The Sultan keeps in his service 500 manufacturers of golden tissues, who weave the gold brocades worn by the wives of the Sultan, and given away as presents to the Amírs and their wives."

* Elliot's History of India, III—578.

670. Shortly after this, Ibn Batúta* visited Delhi in the time of Muhammad Tughlak about A.H. 743 (=A.D. 1342). He mentions among the presents sent by the monarch of Delhi to the Chinese Emperor "one hundred Bairámi dresses, of the value of a hundred dínárs each, one hundred silken dresses, five hundred saffron-coloured dresses, &c."

Ibn Batuta.

671. Firoz Shah Tughlak (1350—1388 A.D.) a good though eccentric monarch, sought to arrest the tide of luxury by sumptuary laws against silk. In his *Fatúhát*† he writes:—

Firoz Shah Tuglak.

672. "Formerly the garments of great men were generally made of silk and gold brocade, beautiful but unlawful. Under a divine guidance I ordered that such garments should be worn as are approved by the laws of the Prophet, and that choice should be made of such trimmings of gold brocade, embroidery or braiding, as did not exceed four inches (Ásabi) in breadth. Whatever was unlawful or forbidden by or opposed to the law was set aside."

673. This brings us to the ceremonial laws of Islám, which prohibit the use of pure silk fabrics for men's wearing apparel, but allows it for women's dresses. The authorities are quoted below:—

Moslem prohibition of silk as wearing apparel for men.

Shiah Hadises.

674. I.—"It is not lawful for a male to wear silk except in battle."—Sharah Kabír, Volume I, pages 64-5.

Shiah Hadises.

675. II.—"The Prophet of God did not permit any one except Abdur Rahman Ibn Auf to wear silk; because his dress was infested with lice."—Sharah Kabír, Volume II, book of Shahádát.

676. III—"The Prophet declared that gold and silk were permitted for the use of women but prohibited for men.—Jawáhir-ul-kalám, Book Salát and Shahádát.

677. IV—"Whoever wears silk in this world will not wear it in the next."—Makásib of Shaikh Murtaza, page 22.

678. V.—"Silk and brocade are not permitted except in the time of war. In battle they are permitted even though they are covered with pictures."—Man-lá-yahzarahul-faqíh, page 82.

Sunni Hadises.

679. I.—The Prophet prohibited pure silk for the dress of men. Some time after this he received a present of silk robes. He made them over to Omar. Omar asked: "You have prohibited silk: why then do you give this to me?" He replied, "I have given you these, not for use as articles of wearing apparel, but in order that you may sell them and take their price. Omar sent the robes to a brother of his in Mecca, who was a non-believer.—Traditions of Abu Dáud, page 180, Volume III.

Sunni Hadises.

[This Hadis shows that the prohibition was made after Hijrat from Mecca, say A. H. 2 or 3.]

680. II.—Ali said that the Prophet once put a silk stuff on his right and gold on his left and declared both of them prohibited for the men of his following.—Sahih Muslim, Volume II, page 189.

681. The upshot of these Hadises is that fabrics of pure silk called in Arabic (حرير محض) are prohibited to be worn by men. There is an exception to this rule in time of war and in time of necessity: *e.g.* to avoid great cold or the plague of lice; also in the case of borders of various kinds, such *gót*, *maqzi*, &c., to the limit of four inches in width; also carpets, cushions, pillows, quilts, *zer-andáz* (huqqa carpets), and *juzdáns* (book covers), which are not included in

* See Travels of Ibn Batuta, ed. Lee, Lond.: 1829, page 154.
† Elliot's History of India, III, 382.

wearing apparel; for the prohibition extends to wearing apparel alone. Of course if any of these articles, *e.g.* silk or brocade quilts or coverlets, are used for wearing on the person, without any of the special circumstances of necessity specified above, it becomes prohibited. Mixed silk fabrics are permitted, whether the mixture be with cotton, bark, hair, or wool, provided that the mixture of these substances be not so small in proportion as to practically entitle the stuff to be called a pure silk fabric. The prohibition is only about pure silk for men; when the mixture is made the rule ceases to have effect.

Mixed fabrics.

682. Hence the invention of *mashru* and the many mixed cloths manufactured in India.

683. The reason of the prohibition is undoubtedly akin to the principle of sumptuary laws. A man in a warrior race has no business with effeminate luxuries such as silk or gold; but in a battle it was supposed that the silk fabric offered a physical resistance to the edge of the sword, and was therefore allowed.

Reason of the prohibition.

684. Cocoon shells of silk are used in Yunáni medicine, and most *pansáris* (grocers) in towns keep them for this reason. For this purpose yellow cocoons, not pierced, are valued and they may be given internally either as a *sharbat* (solution), *arq* (extract) or *sufúf* (powder). The cocoon shell should be cut with scissors (*abresham khám muqarraz*). The *Makhzan-ul-adwiya*, a sort of Materia Medica of Yunáni medicine, thus describes the virtues of this substance:—

Cocoon shell in Yunani medicine.

685. "Properties: warm and dry, soft and absorbent; strengthens the heart and gladdens the spirit (*mufarrih*); is fattening; cures temporary aberration, weakness of the stomach, chest, and lungs, strengthens the memory. Boiled with sugar and water, it cures constipation and improves the complexion (*rang-i-rukhsár*). It is a good remedy for wounds, granulated eyelids, itching of the eye-lids, and a tendency to lachrymation: in bleeding of the nose, burnt silk is applied."

Virtues ascribed to it.

APPENDIX I.

Tests for Silk.

The following chemical tests for silk are mentioned by Mr. B. F. Cobb in his article on Silk in "Bevan's British Manufacturing Industries" (Lond. 1877), and may be appended here for convenience of reference:—

"The tests for silk are by burning and treatment with chemicals. Silk, if burnt, gives off the well-known smell of burnt horn.

"Nitric acid turns it yellow, and dilute acids have little immediate action. Akalies dissolve it, but as no sulphur is present, there is no formation of a sulphide, and the acetate of lead does not yield a black precipitate. Dilute alkalies affect it, but without solution. Ammonia has no action. In the cuprate of ammonia, the ammoniacal solution of copper sometimes known as Schweitzers's test, it dissolves like cotton. Its affinity for colours is like that of wool. To detect cotton, hemp, flax, and jute in mixture with wool and silk, boil the sample in an aqueous solution of soda containing 10 per cent. of hydrate of soda. Wool and silk dissolve, while the vegetable fibres remain unacted upon. The whole is thrown upon a cotton filter, and the undissolved matter is then washed with hot water, and afterwards acidulated with 5 per cent. of hydrochloric acid, to which, if the residue is black or dark-coloured, a few drops of chlorine water are added. Meantime the original alkaline filtrate can be tested for wool with the acetate of lead. If a white precipitate is formed, which dissolves on stirring, silk alone is present. A black precipitate indicates wool. The nitro-peroxide of sodium gives a violet colour if wool is present. If the tissue is deeply-coloured, it may be cut up and steeped for 15 to 20 minutes in a mixture of two measures of concentrated sulphuric and one of fuming nitric acid. Wool, silk, and colouring matters are destroyed, while the cellulose is converted into gun-cotton. White and pale mixed tissues may be tested by their affinity for colours. They must be cleansed and rinsed thoroughly in water to remove starch and similar dressings; boiled for 10 minutes in water containing 2 per cent. carbonate of soda and a little soap; then rinsed in hot water; steeped five to 10 minutes in water at 50 to 60 degrees cent., containing 2 per cent. sulphuric acid, and washed again. In the meantime the colour bath must be prepared by dissolving a few decigrammes of magenta in 28 to 30 cubic centimetres of water and heated to boiling; and during ebullition add to, drop by drop, caustic soda till a pale rose colour only remains in the liquid; take off the fire, and put in the sample; after some minutes take out to dry. Silk and wool are dyed, while the vegetable fibres remain colourless. Wool may be detected in silk by the presence of sulphur; if it is immersed for a short time in plumbate of soda, the silk will be colourless and the wool black; or a piece of the tissue, two centimetres square, may be boiled in 10 to 12 cubic centimetres of Schweitzer's test; in from five to 10 minutes the silk will be dissolved. If the silk is black, add double the volume of Schweitzer's test and soak from 10 to 12 minutes; after taking out the undissolved wool, the liquid quickly neutralized with nitric acid, gives no precipitate if silk only is present, while cellulose is precipitated.

"Hydrochloric acid is a solvent of silk, while it leaves wool and cotton unacted upon for a lengthened period."

APPENDIX II.

List of books and papers consulted.

1. A Monograph on Trades and Manufactures in Northern India, by Dr. William Hoey, C.S., Lucknow, American Methodist Press, 1880.

2. The History of India as told by its own Historians. The Muhammadan Period. Edited from the Posthumous Papers of the late Sir H. M. Elliot, K.C.B., East India Company's Bengal Civil Service, by Professor John Dowson, M.R.A.S., Staff College, Sandhurst, Vol. III, London; Trübner & Co, 1871.

3. The Textile Manufactures and the Costumes of the People of India, by J. Forbes Watson M.A., M.D., F.R.A.S., Art Reporter on the Products of India, to the Secretary of State for India in Council. Printed for the India Office by George Edward, Esq. and William Spottiswoode, Printers to the Queen's Most Excellent Majesty, London, 1866.

4. The Travels of Ibn Batuta translated from the abridged Arabic manuscript copies preserved in the public library of Cambridge, with notes, illustrations of the History, Geography, Botany, Antiquities, etc., occurring throughout the work, by the Revd. Samuel Lee, B.D., London, printed for the Oriental Translation Committee, London, 1829.

5. British manufacturing industries, edited by G. Phillips Bevan, F.G.S., second edition, London. Edward Stanford, 55, Charing Cross, 1877.

6. Ayeen Akbery, or the Institutes of the Emperor Akbar, translated from the original Persian—by Francis Gladwin, in three volumes, Calcutta, 1783—86.

7. A Handbook of Indian Products, Art Manufactures, and Raw Materials, by P. N. Mukharji, author of a rough list of Indian Artware and a Descriptive Catalogue of Indian Products contributed to the Amsterdam Exhibition: published by J. Patterson, Calcutta, printed by C. J. A. Pritchard at the Star Press, 19, Lall Bázár Street, 1883.

8. Notes from the South Kensington Museum Art Handbook. The Industrial Arts of India—by George Birdwood, C.S.I., M.D., Edin. Published by the Committee of Council on Education, London W., 1880.

9. General report of the North-Western Provinces Exhibition held at Agra, February 1867, Roorkee; printed at the Thomason Civil Engineering College Press, 1868.

10. Sericulture in Oudh, by Dr. E. Bonavia, Lucknow, 1863.

11. Liotard's Memorandum on Silk in India, Part I, 1883.

12. Silk in India—some account of silk in India, especially of the various attempts to encourage and extend sericulture in that country, compiled by J. Geoghegan, Under Secretary to the Government of India, Department of Agriculture and Commerce, second edition, Calcutta; Office of the Superintendent of Government Printing, 1880.

13. Statistical, Descriptive, and Historical Account of the North-Western Provinces of India, Vol. XIV, Part I, Benares: by F. H. Fisher, B.A., London and J. P. Hewett, both of the Bengal Civil Service, Allahabad, North-Western Provinces and Oudh Government Press, 1884.

14. Census Report of 1881.

15. Census Report of 1891

16. A Dictionary of the Economic Products of India, by George Watt, Vol. 6, Part 3, articles on Silk, London and Calcutta: published under the authority of the Government of India, 1893.

17. Handbook of the Collections illustrative of the wild Silks of India in the India Section of the South Kensington Museum, with a catalogue of the collection and numerous illustrations; by Thomas Wardle, London, 1881 (South Kensington Museum Handbook).

18. *Pioneer* of 5th October 1898.

19. *Pioneer* of 9th November 1898.

20. Final report of the eighth Revision of the Land Revenue Settlement of the Dehra Dún District, by F. Baker, Esq., C.S., late Superintendent of the Dún, and in charge of the Settlement Operations, Allahabad, North-Western Provinces and Oudh Government Press, 1886.

21. Mr. Reid's Settlement Report of Azamgarh, 1879.

22. Azamgarh Gazetteer, by F. H. Fisher, B.C.S., Allahabad, 1883.

23. Annual Reports on the Operations of the Department of Agriculture and Commerce, North Western Provinces and Oudh, (now Department of Land Records and Agriculture) from 1882 forwards—*passim*.

24. Monograph on Dyes and Dyeing in the North-Western Provinces and Oudh, by Sayid Muhammad Hadi, M.R.A.C, M.R.A.S., Assistant Director of Land Records and Agriculture, North-Western Provinces and Oudh. Published by authority, Allahabad, printed at the Government Press, 1896.

25. The Agriculture Ledger, 1898, No. 16. The Arabian Drug—Waras or Wars. A description of its history, uses and composition, with remarks on its occurrences in India, by the officiating Editor.

26. Proceedings of the Government of the North-Western Provinces and Oudh—*passim*.

47. District Reports for this Monograph.